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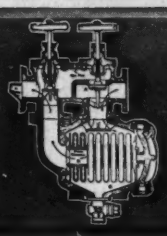

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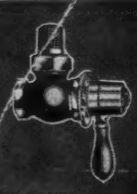

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THE HEATING AND VENTILATING MAGAZINE

1123 BROADWAY NEW YORK JUNE, 1916

Natural Ventilation in the Federal Hill School

An Unusual Combination of Window Air Inlets, Excessive Radiation and Exhaust Flues.

BY HAROLD L. ALT.

Those interested in the heating and ventilating of public schools will find the system recently installed in the Federal Hill School at Bristol, Conn., deserving of more than passing notice. The original building was heated by direct radiators, supplemented by indirect stacks which also supply air for ventilation purposes. The system in the old building was purely a gravity one and not very satisfactory, requiring considerable steam pressure to circulate. When the new addition was erected, a view of which is shown in Fig. 1, an effort was made to improve on the older installation, this finally developing into a method of heating and ventilating following closely upon the ideas carried out in the Fairfield School, in New Haven.

The system finally incorporated was more or less experimental in nature, and consists briefly of two exhaust flues for each class room with registers about 8 feet above the floor. All the fresh air for the class rooms is obtained by the opening of the windows at the bottom where adjustable glass deflectors are placed so as to prevent drafts blowing directly on the pupils. In order to allow a sufficient quantity of air to enter for satisfactory ventilation, without undue cooling, the radiation was arbitrarily increased from the normal amount usually installed to the quantities shown on the basement, first and second floor plans given in Figs. 2, 3 and 4.

THEORY OF INSTALLATION.

The theory of the installation is that the cold air entering through the lower part of a partially-opened window is deflected toward the ceiling both by the

FIG. 1—FEDERAL HILL SCHOOL.

ventilator and the upward current of hot air from the enormous radiators. The hot and cold air currents mix during the upward passage, thus producing a modified temperature of about 70° F., this tempered air falling backward toward the floor and onto the pupils' heads. Having become slightly heated by contact with the human element in the room, the contaminated current tends to rise again toward the vent registers, the air finally leaving the rooms by way of the two exhaust flues.

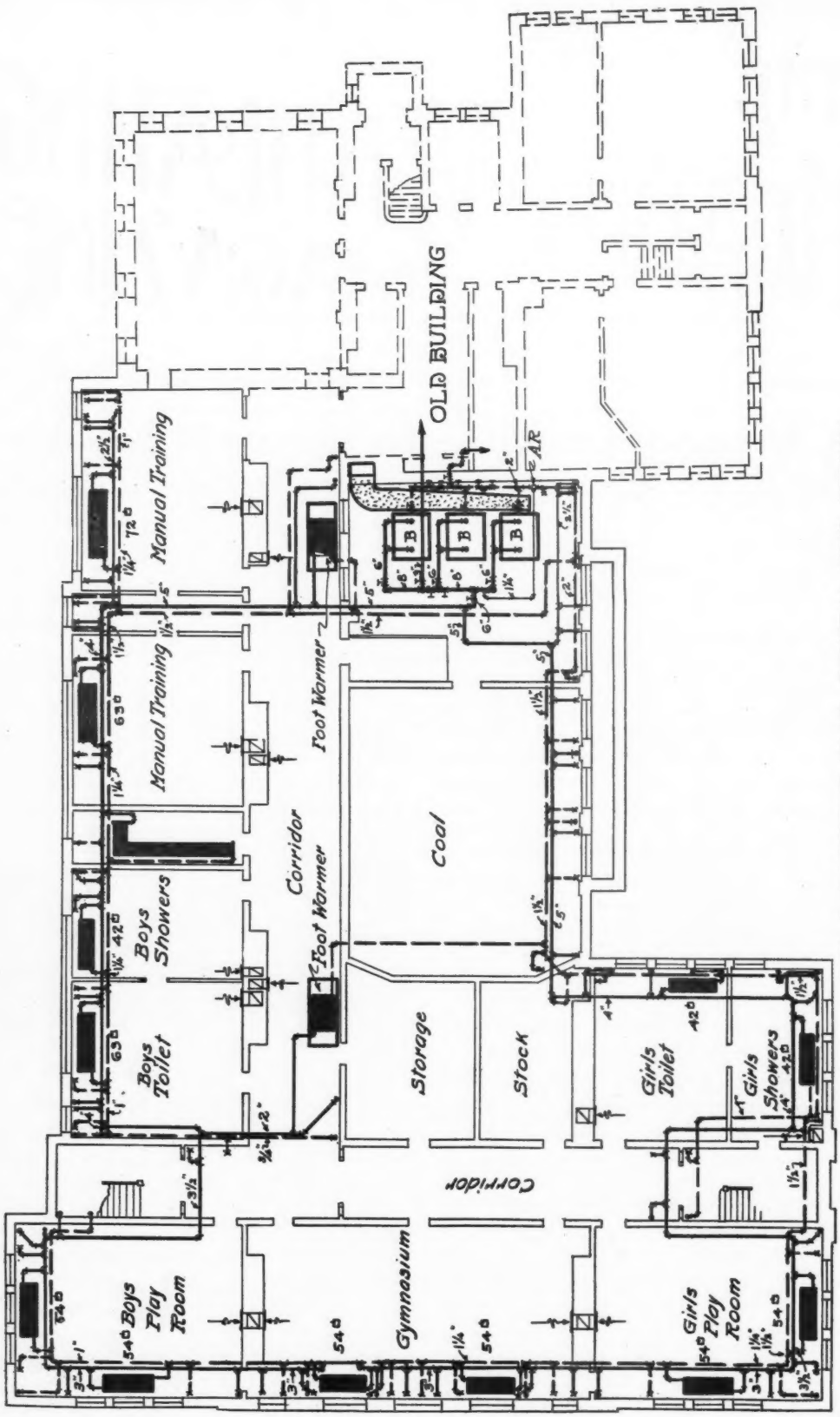


FIG. 2—BASEMENT PLAN, FEDERAL HILL SCHOOL.

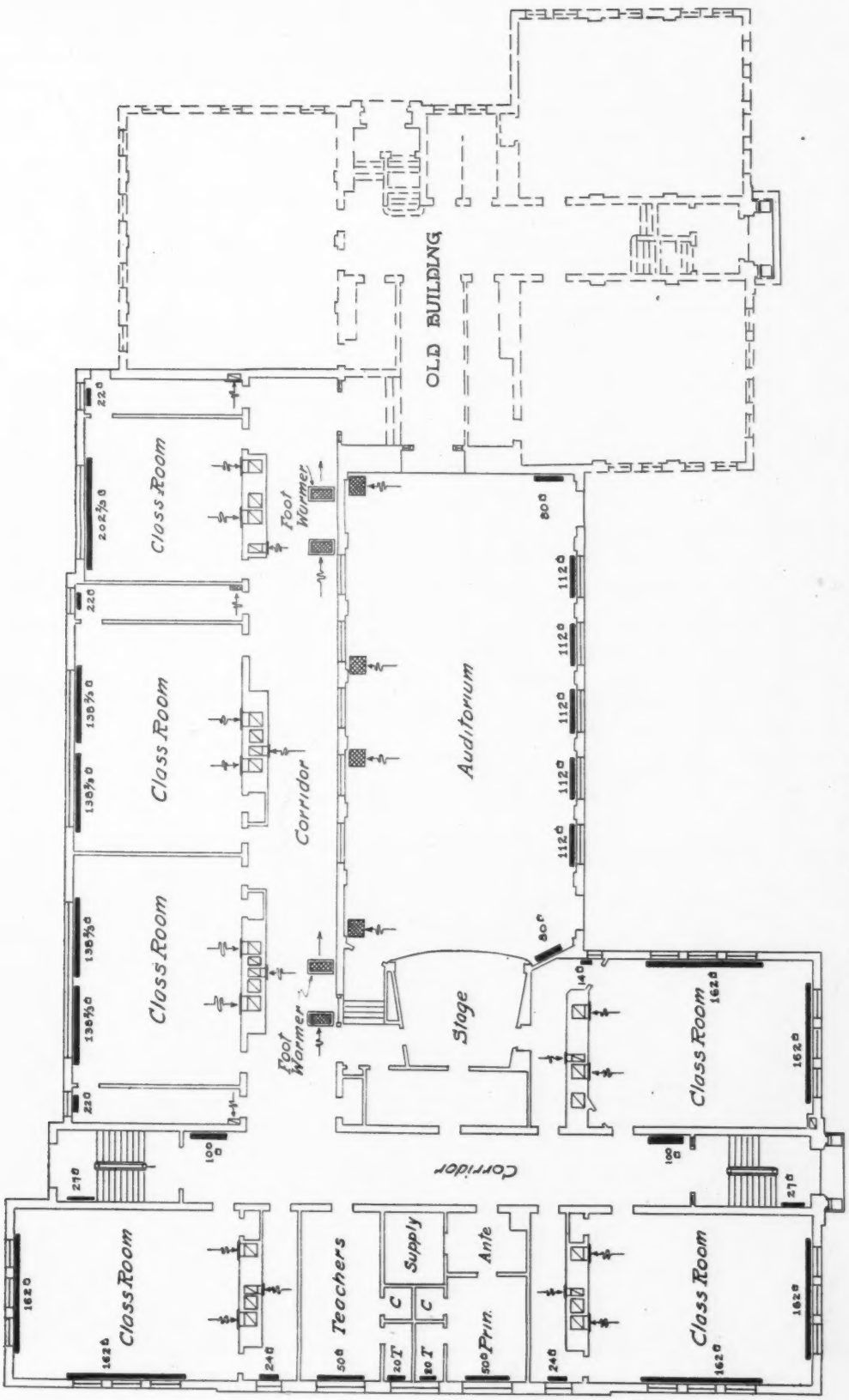


FIG. 3—FIRST FLOOR PLAN, FEDERAL HILL SCHOOL.

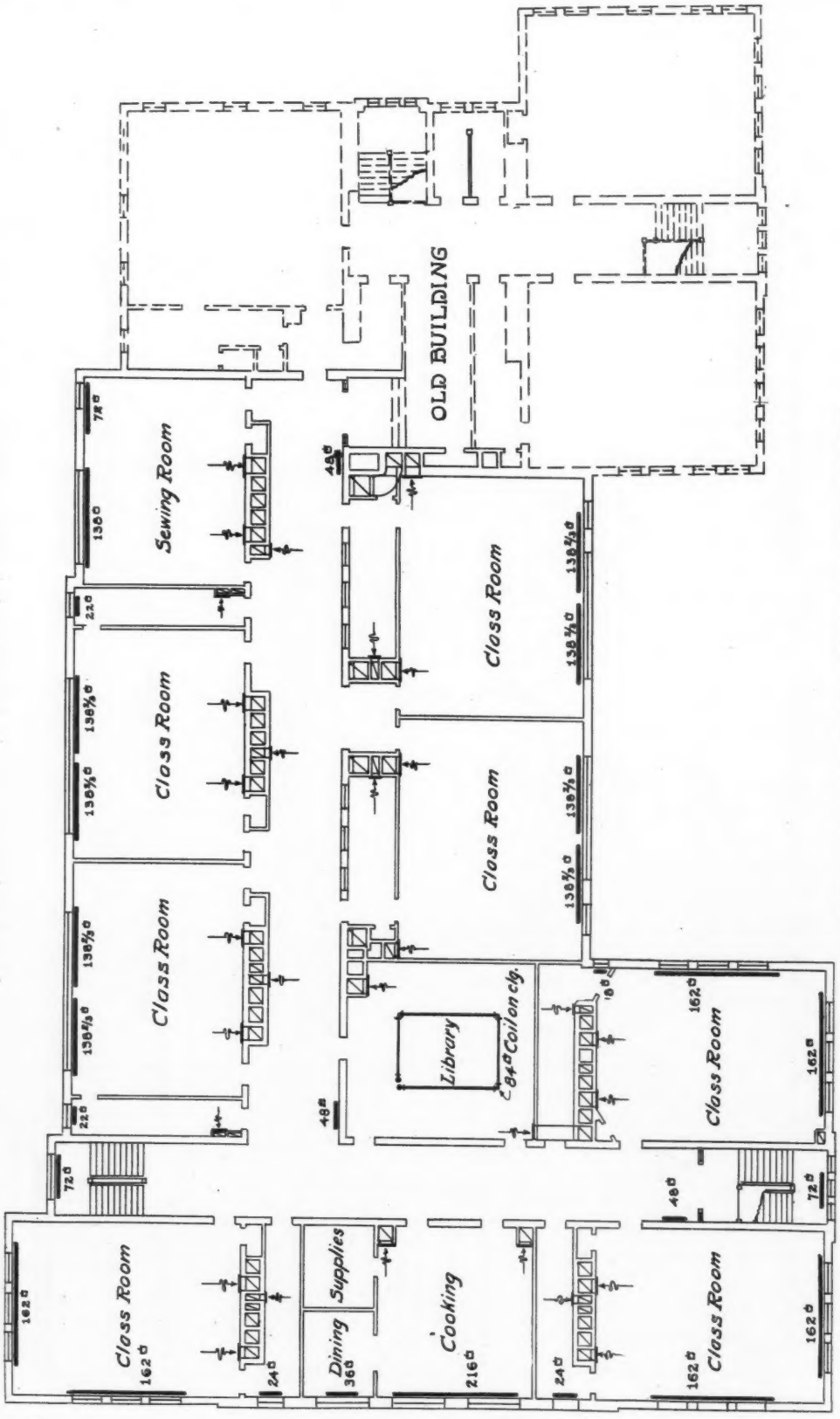


FIG. 4—SECOND FLOOR PLAN, FEDERAL HILL SCHOOL.

This method involves the problem of controlling large radiator units so as to prevent discomfort to the pupils sitting beside them, and the supplying of sufficient heat in the rooms to allow ventilation in extreme weather. Rooms on the

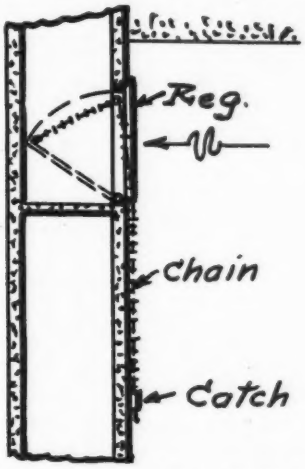


FIG. 5—DETAIL OF EXHAUST OUTLET.

windward side must also be protected from excessive drafts between the windows and the exhaust registers, caused by the outside wind pressure.

The draft proposition was successfully overcome by using adjustable dampers in the exhaust registers operated by chains, these being shown in Fig. 5, and located in general as shown in Fig. 5a, while the radiators were placed on a modulated steam system with graduating valves on the supply and traps on the returns. In general American Radiator Company's Peerless radiators, 26 in. high, legless and wall hung, were used, the supply and return valves being of Thermograde manufacture.

At first it was thought that radiator shields would be required, owing to the large amount of surface, but the modulation system has been so satisfactory that the shields have not proved a necessity. Their use, however, would undoubtedly be an improvement, though there was only *one* teacher in the building who thought the children were uncomfortable at times on account of the close proximity of the large heating surfaces.

For one who is familiar with many schools where all sorts of ventilating systems are in use, including gravity systems, etc., the sensation of entering the Federal Hill School is novel. There is a "fresh" smell and a total lack of the well-defined "school" odor so common where simply a fan system of 30 cu. ft. per minute per pupil is the basis of air change. This "freshness" may perhaps be deceiving and may be only the result of getting a certain amount of cold and untempered

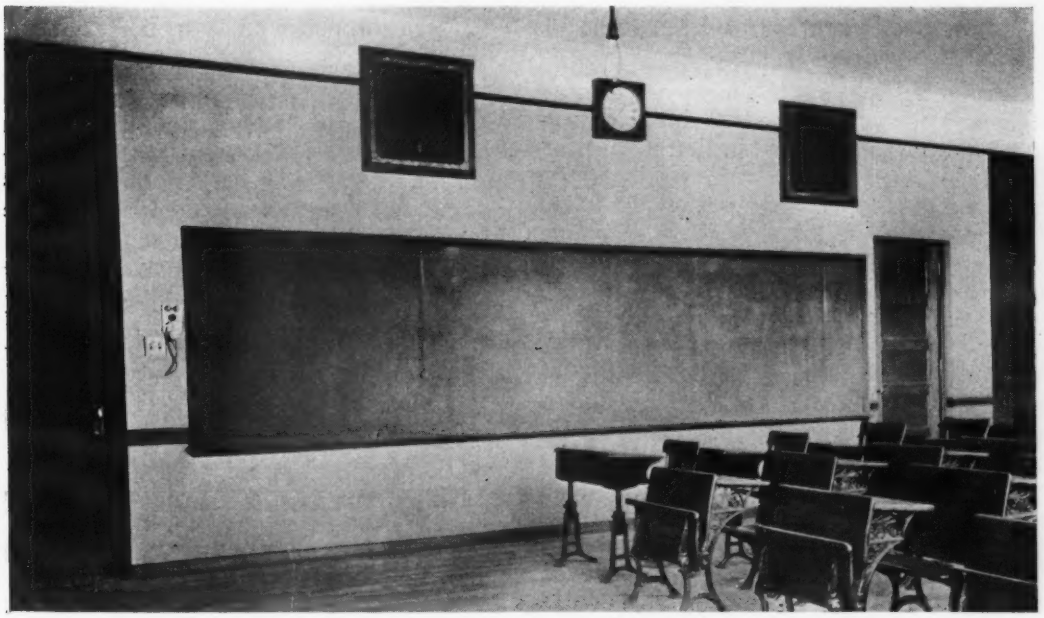


FIG. 5A—VENT OUTLETS IN CLASSROOMS, FEDERAL HILL SCHOOL

air into the rooms, but whatever the cause the pleasant effect is there.

DETAILS OF EQUIPMENT.

In the boiler room three H. B. Smith Company No. 44 twelve-section Mills boilers are installed, one being for the old section and two for the new building. The valving is arranged so that either one of the two end boilers can be operated entirely independently of the others and at the higher pressure necessary to be maintained on the old system.

On the new building modulation system all the returns are carried to a Van Auken alternating receiver AR (Fig. 2) and are then connected to the boiler return, with a vent run to the chimney, all as shown in the diagram of connections, Fig. 6. The receiver is set midway between the water line of the boiler and the level of the main return from the building.

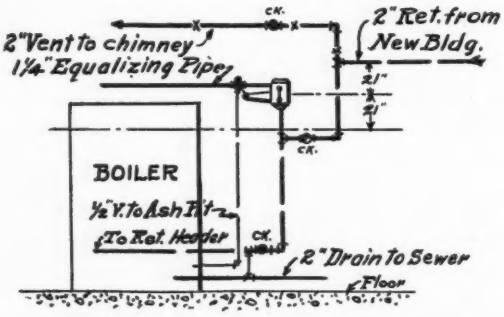


FIG. 6—ALTERNATING RECEIVER CONNECTION.

Drips on the supply mains are carried through water seal valves into the return mains, as indicated in the detail, Fig. 7. Care was used in running back the return mains to avoid all pockets and also to avoid dropping below the water line of the boiler, as this would prevent proper air relief.

In the first floor corridor two foot-warmers are installed, consisting of 12 sections each of 40 in. Vento heaters on 4-in. centers, hung in the duct, as shown in the cross section, Fig. 8.

Much of the space in the breathing walls on the first floor is utilized for flues necessary for a common fan supply system, these being omitted from the drawings to avoid confusion. By the use of these extra flues and some of the vents already installed it is possible, if ever desired in the future, to turn the system

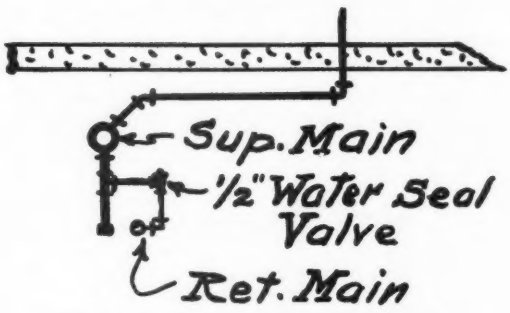


FIG. 7—DETAIL OF DRIPS ON MAIN.

over into a "fan-supplied gravity exhaust" system without building any additional flues.

The window deflectors are sections of glass sash about 12 in. high, these being carried between two wooden side wings by screws inserted through slotted holes in the wings. By this means the deflector can be lifted and set in any desired position, the details being as shown in Fig. 9, and the finished appearance as shown in Fig. 10.

The boilers are valved as shown in Fig. 2, owing to the necessity of maintaining higher pressure on the old building lines than is required on the modulation system, as previously explained. Double valves are installed on the return with a test tee between so as to allow the second boiler to be used either on the higher or lower pressure.

DEFECTS OF SYSTEM.

While everyone praised the ventilation, the coal bill was small, motor charges were nil, and the installation much cheaper than a fan system, yet, the question may be asked whether the system is as good as a fan-supplied ventilation system based on 30 cu. ft. per minute.

To this question the writer feels competent to answer, "No." This is in defiance of the almost unaminous verdict of the teachers and principal who are heartily

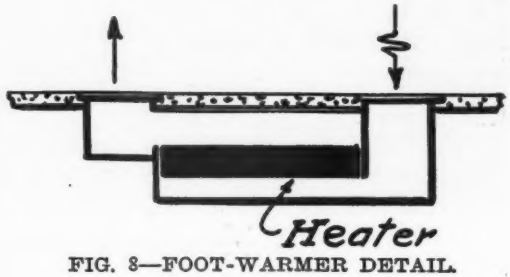


FIG. 8—FOOT-WARMER DETAIL.

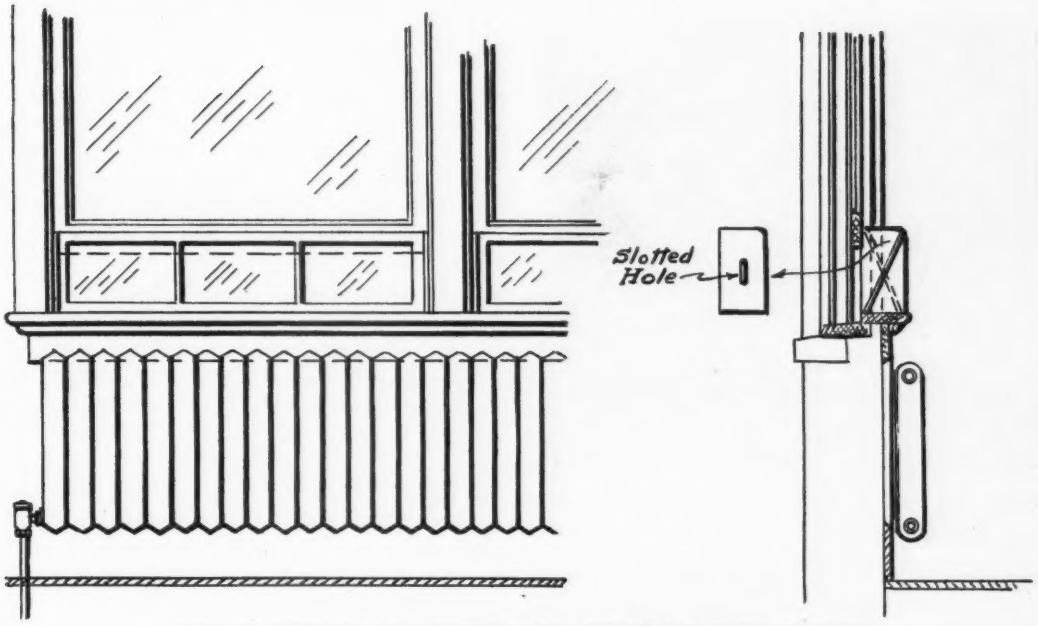


FIG. 9—DETAIL OF VENTILATOR, FEDERAL HILL SCHOOL.

in favor of the system. The objections are briefly these:

(a) Possible inadvertent omission on the teachers part to open the vent dampers full as soon as this can be done without creating drafts. (Many vent flues were almost entirely closed when inspected although there was no noticeable outside wind.)

(b) Similar possible omission in regard to the windows. (Many rooms were being used with only 50% of the windows open.)

(c) Absolute impossibility of controlling humidity.

(d) Absolute impossibility of washing or filtering the air.

(e) If less coal is being burned with this system than with a fan system of similar size, it stands to reason that *less* air is being delivered into the rooms.

(f) No positive air delivery at all times

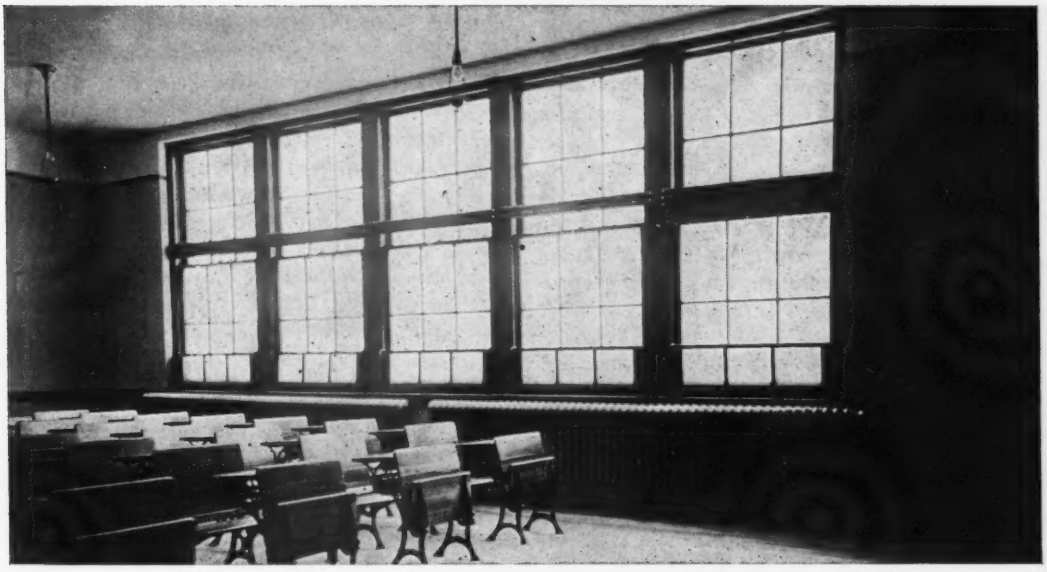


FIG. 10—FINISHED CLASS ROOM RADIATORS AND VENTILATORS, FEDERAL HILL SCHOOL.

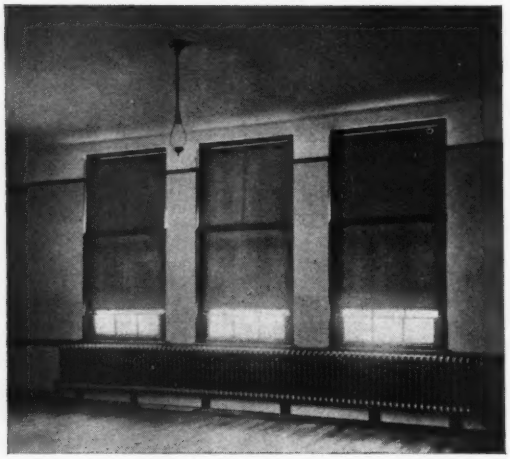


FIG. 12—AN 81-SECTION RADIATOR IN THE FEDERAL HILL SCHOOL.

nor any way to make delivery of any specified amount (either small or large) assured.

It can be seen from the above that in spite of the "freshness" of the air in the school, and in spite of the economy of operation there are many serious faults which can be urged against this method. Yet in sections where clean air is obtained from outdoors and where a fan system *without* an air washer would be the only other alternative on account of initial cost, this idea would undoubtedly be a saving on the first cost of installation.

It is specially desired to call attention to the large number of sections used in the radiators, these running as high as 81 sections on the single-column radiators and 76 sections on the two-column radiators; a view of an 81-section radiator is shown in Fig. 12. The building was designed by Walter P. Crabtree of New Britain, Conn., while the heating was designed by the R. D. Kimball Co. of New York and was installed by Libby and Blinn of Hartford, Conn.

Co-operating with the Consumer

With Suggestions for Changes in Steam Heating Equipments to Produce Economy in Operation.

BY WILLIAM J. BALDWIN, JR., C. E.

(*Presented at the annual convention of the National District Heating Association, in New York, May* 16-19, 1916.)

The consensus of opinion which seems to prevail, among present day progressive management of public utility properties, is agreed as to the wisdom of forming a friendly acquaintance and better understanding between the company and the consumer.

There is, however, a difference of opinion as to how far cooperating with the consumer should be extended. Many believe this is a very important matter, and one which should be considered from every angle. There can be *no* question, that a policy of independent indifference to the consumer's interest, so prevalent with many of the utility companies, *in former days,* is steadily giving way to one of cooperation, with a view of firmly establishing a mutually satisfactory business relationship.

The policy of willing cooperation is *far preferable* to forced regulations by commissions. The methods of applying such a policy will necessarily differ,—depending upon many conditions. No fixed, hard and fast rules or regulations can be set down to meet all cases. The working out of details in almost every individual case must be left, to a considerable extent, to those who come in personal contact with the consumer to diplomatically and carefully handle the matters as they come up.

POLICY OF GIVING SERVICE AS WELL AS SELLING STEAM.

A broad policy of *giving* service, as well as *selling* steam, was adopted and put into force, in a practical way within the last year by the present management of the New York Steam Company, with the result, that a *closer friendly understanding* exists between the company and its consumers.

While it is not the intention to criticise the policy of the former management of the company, you, who have lived in New York City and have been in touch with its building operations in former years, know the feeling of owner, architect and engineer towards not only the steam company, but every public utility corporation.

To the minds of *many*, it was a question of accepting a necessary evil. Possibly in some cases this feeling was not entirely justifiable, but was frequently due to a lack of *getting together* on matters of *mutual* interest. This feeling is fast passing away, due to the desire on the part of both the company and its consumers, to know each other better.

The *former* policy of the New York Steam Company—not unlike that of many other steam companies—was to avoid assuming any obligation in connection with the consumers' equipment and not to go beyond the service valves and meter. In carrying out this policy naturally, no adequate provision was made in its organization to take care of consumers' complaints, where the complaints referred to consumers' equipment. They were not prepared to render proper assistance to a new prospect or consumer who wanted advice on matters of steam, heating or power equipment.

CAUSE OF DISSATISFIED CUSTOMERS.

In consequence of their not being in position to advise or render assistance, either at the conception of the installation of an equipment, or thereafter when the consumer had equipment troubles, they were obliged to assume a side stepping policy of *apparent indifference*, by referring all such matters to the consumer's steam fitter, architect or engineer. The result of such a policy must be to have *dissatisfied* consumers. Although the consumers may have no legal claim, they *feel* the company has a moral obligation which it is trying to evade.

There may be a psychological reason for some of the ill feeling on the part of consumers towards a steam company. Is it not true, that when we do not understand a thing *clearly*, we are likely to be unreasonably critical and suspicious of it?

FEW PEOPLE UNDERSTAND STEAM.

Comparatively few people *really* understand steam, sufficiently to be able to clearly think in terms of steam. Many only vaguely associate the steam supply to the warmth of their premises, but seldom give the subject sufficient thought to reason out what actually takes place in the heating apparatus. If any part of the premises is not sufficiently warm, or if anything goes wrong, one thought only enters their mind; namely, the Steam Company is responsible. As a matter of fact, perhaps not once during the whole season has the steam supply been shut off or the steam pressure in the company's mains even been reduced below normal pressure.

Any one of a hundred or more things may go wrong with the heating equipment, but the consumer seldom takes any of these into account. Some consumers will never be satisfied unless every radiator is hot to the touch, and will not believe that the equipment is responsible for their discomfort. If a radiator is air bound or a room cold they believe it is the fault of the Steam Company.

Many cannot understand how steam is metered, and when you talk condensation, they think water is coming into their heating system from the street mains instead of steam.

To get them to differentiate between pounds of steam condensed and *used*, and pounds' *pressure* of steam, is often quite a task. If anyone is foolish enough to try and explain how the latent heat of steam is given off, the result is disastrous. It is better to talk in the plainest terms possible, and show by demonstration what actually takes place, and how results can be obtained, and how economies can be had.

About 95 per cent. of the residences we supply in New York have indirect radiation, which adds to the troubles experienced by consumers and makes more difficult the efforts to get them to understand their heating equipments.

You cannot *stop* consumers' complaints; they will continue so long as steam is supplied. It is a natural thing to expect and the consumer is not to be condemned, but should be reasoned with

diplomatically, and here is where the success or failure of cooperation begins.

GETTING THE CONFIDENCE OF CUSTOMERS.

A small percentage of people *are* unreasonable, but the vast majority are willing to be met with a fair proposition, if it is presented in a spirit of friendliness. To simply say—*"You are wrong* and we are right"—*even* if the latter is the case, is poor policy from a business viewpoint. We must first get their confidence by expressing a willingness to help them;—then, by explaining carefully where and what their troubles are and how they can be corrected. We get their confidence in most cases, or at least partly overcome their former prejudice. This may not be done in one day, or even in one season, but a policy of untiring cooperation and willingness to work with the consumer will prove a profitable investment by making your customers boost for you instead of knock. It is good advertising, in building up a business or in maintaining one already started.

Few people want something for nothing, and those who do are more likely to try and get it without much complaining to the company. The consumer who makes a good honest complaint because he believes he is right can always be made a friend of if properly handled. To be able to give real cooperation, the company must be equipped with a sufficiently well informed force of willing investigators and a competent engineering department, capable of successfully coping with any condition which may come up. There is quite a distinct line between rendering consulting engineering services gratis and advising or helping a consumer. The former is an exceedingly poor policy, as it is assuming an obligation for which the company is not paid. It also places the company in the position of assuming a responsibility which is likely to lead to complications later. Once the company assumes the position of consulting engineer, it becomes perpetually so, and with no remuneration for such services, and with all the annoyance incidental thereto. The safer way is to simply advise the consumer what he should have and suggest where necessary that he procure the services of an engineer or steam fitter as the case may require, and then offer to cooperate and work with the engineer or fitter. There are times when the consumer requires assistance quickly. We might call it "first aid." A reducing valve has given out, or a house thermostat becomes inoperative, or the return trap floods, or something else becomes inoperative which should be taken care of at once for the comfort or safety of the occupant of the premises. Some member of the family or servant thinks only to call the Steam Company. This is the time when a little assistance may mean so much to the comfort of the consumer, and an ounce of help in time is worth a ton of regrets and explanations later. If you are not ready, willing and prepared to assist him and if you tell him to *"Get his steam fitter"* he is likely to remember it when some neighbor who contemplates taking the steam service, asks him how he likes it. The consumer as a rule does not expect you to install a new valve or trap, or to correct the defects in his equipment; he is willing to pay his steam fitter for this work, but he does expect assistance to help him get the best results from the use of your service with the equipment he has, and he expects the company to call to his attention things which are likely to cause trouble and make for high consumption.

While referring chiefly to heating consumers, the same policy will apply to power steam consumer.

We cannot stop at the front wall of the building and expect to have satisfied consumers. We must literally go inside and shake hands with the consumer and let him know we have his interests in mind as well as our own interests.

A real policy of cooperation should mean, that no matter what the complaint is, or when or where it is, the company is interested enough to investigate it without unreasonable delay, and advise the consumer as to what is best to be done.

The company's legal responsibility *should* stop at the front wall of the building, but the company's interest should not stop there, but should extend to a point where the consumer is getting

the greatest possible efficiency and satisfaction with the use of the service.

PRINCIPAL COMPLAINTS OF CONSUMERS.

There are two chief complaints that consumers register against the Steam Company: "Our bills are too high," or "we cannot get enough heat."

You can see, therefore, cooperation along these lines is not compulsory, for the reason that both these complaints are matters entirely within the consumer's hands. With a sufficient pressure of steam in the mains for heating or power, and with meters that are examined weekly and tested several times a season, we have complied legally with any demands that consumer can make or sustain.

The consumer who always complains at the amount of his bill does so through habit, not because he knows. Some consumers will never consider shutting off a radiator or a main stop valve, thinking the Steam Company might benefit by it. I have actually heard consumers say this, when explaining to them how to economize. If this class of consumer took as much time to get a heating engineer or steam contractor to go over his equipment with the assistance of the Steam Company engineer as he does to writing letters of complaint and threat, he would save time and money. It may not be good business to tell him this in so few words, but by offering to look over his equipment, and then by giving him a logical explanation of the reasons for his high consumption, you *may* get him to a point where he is willing to consider your suggestions, with the result that if he does save steam he is your friend and will take your advice thereafter without question, and will talk for you.

The consumer who is regularly complaining that he does not get enough heat, or is having trouble with noise or leaks, or inoperation of parts of his equipment, requires more constant attention than the average. This class of customer may be an actual loss instead of profit at first, due to the time and attention necessary to be given him; but these cases are comparatively few, compared with the whole, and, like a doctor who is obliged to give considerable time to the unprofitable patient, we must consider these as unavoidable. It will never do to let our patience become exhausted, for one dissatisfied consumer does more harm than a dozen satisfied ones *can repair*.

SOME TYPICAL FAULTY INSTALLATIONS.

It is not the intention to detain you with the small details of how we handle complaints in carrying out the policy of cooperation as set down by the present management of the New York Steam Company, but perhaps a little time to a few of the important details may not be amiss.

Until quite recently, few heating equipments were designed to take steam from the street mains in New York City. This resulted in many changes in piping and in the usual additions to the heating equipment, which were often made by the consumer's plumber or fitter, without the care or supervision of an engineer, or the cooperation of the Steam Company, and the results were often unsatisfactory.

Many of the older residences had old hot air furnaces, brick-set. These furnaces were removed, and the brick enclosure was filled up with indirect steam radiators, any old way to get in a few hundred square feet of heating surface, the amount the plumber or fitter thought was necessary to warm the house. Little attention was given to the question of the amount of air which should pass through the indirect radiators, or how much steam might be condensed, or as to whether the flues were large enough for such a system. The result is we have some remarkable examples of inadequate heating apparatus in some of our fine residences. Many of these systems have been and can be greatly improved and we are endeavoring to get the consumer's fitter to work with us, and by acting in an advisory capacity we often help the consumer, even though the equipment as installed can never be made ideal.

Again, let me say there is a distinction between acting as the consumer's consulting engineer and helping in an advisory capacity.

Sometimes it is advisable to suggest to a consumer to put in an entire new heating system, but this is not often.

SUGGESTIONS FOR PROMOTING ECONOMY.

There are certain things which can and should be done for ordinary good economy in almost every equipment, and if we will advise a consumer, and cooperate towards getting these things done, in the best possible way, the result will prove mutually satisfactory.

First: The matter of a proper means of controlling or regulating the supply of steam at a main stop valve. This can be best done in many cases by installing a house thermostat. This, if properly installed, will save its cost in a short time, and will always prove a good investment.

Second: The matter of recirculating at least part of the air in connection with the indirect radiators, instead of taking all cold air from out of doors, as is the general custom in New York.

In the average house, heated with indirect radiation, the amount of cold air admitted is far in excess of anything that is necessary for good ventilation. Often one-quarter of the amount of fresh air admitted would be sufficient for ventilation. If the cold air inlets are properly adjusted and the air in the house is recirculated through the indirect radiators a large quantity of steam can be saved. There are several ways this can be done at small expense.

Third: The matter of utilizing the heat in the water of condensation discharged from the heating system return traps before it goes to the sewer, should always be carefully considered. Most of the systems have a cooling coil through which the condensation is discharged, but frequently this simply cools the condensation and overheats the cellar. The cooling coil should be connected to the heating system in some way, and used as an economizer. About one-tenth of the total heat of the steam is available in the condensation and can be utilized and the steam consumption reduced proportionately.

When steam is used for heating water for domestic purposes, the heat in the condensation can be utilized for this purpose at a small expense by installing a preheater in connection with the hot water tank.

There are, as you know, innumerable small economies that can be suggested as secondary, such as temperature regulations for hot water tank, covering the steam pipes and return pipes, and other hot furnaces not used for heating; adjusting blowing air valves, improving steam traps, etc., and while these are secondary they are still important.

Then last, but not least, is the matter of instructing the consumer how to operate the equipment for daily economy, and to actually teach him or his servant how to do so, to get the best results. This requires much patience.

During the past winter we have had some remarkably satisfactory results from this policy of cooperation. Steam consumptions in many cases have been lowered from 10 to 30%, and in other cases, apparatus that were inadequate have been made to give fairly good satisfaction, and a small outlay on the part of the company and in many cases at small expense to the consumer.

We have tried to get the consumer's confidence, and in most cases have succeeded.

This policy of cooperation will necessarily lower the steam consumption and at first would seem to work against our sales department. It does not actually prove so, for the reason that the lower the steam consumption per month, the higher the rate that is charged per thousand pounds for steam. We all agree it is better to sell the same quantity of steam at the higher price per 1,000 lbs. This can be done by getting new consumers to take the steam thus saved. If you help the consumer he is more likely to tell his neighbor about it, and this paves the way to procure the new consumer.

What applies to the heating consumer can be made applicable to the steam power consumer. This past winter we have worked with many of our steam power consumers, and have at a small expense given them the help which they required. It has taken time, patience, and logical arguments in some cases, but the results are satisfactory. In one case we advised a consumer how to reduce their consumption about 40,000,000 lbs. per year. Acting upon this advice, they

have spent approximately $30,000 for improvements and we have given them the time necessary to work out the details and have given them the benefit of our experience in the matter of these economies. The result of this cooperation has been mutually satisfactory, and we have closed a contract with them for an additional five years' service. In closing, let me say that the motto of the National Association of Master Steam and Hot Water Fitters, and one which I always considered a rather selfish one, is very apropos and applicable to cooperating with the consumer, namely:

"WHO HELPS ME, I HELP."

The Comparative Effects of Wind and Sunshine on Heating Buildings

BY DONALD B. PRENTICE.*

Rules for determining the heat loss from buildings invariably include a clause regarding the exposure, in effect as follows, "Ten (or fifteen or twenty) per cent. should be added to the heat loss calculated with the above constants, for a windy exposure." Nothing is ever said about decreasing the calculated heat loss because of sunny exposure, for the building must be heated on cloudy as well as sunny days, and the radiation installed must be designed for the maximum heat loss and the minimum heat gain from the sun's radiation.

Although the radiation allowed for warming a building can not be decreased because of a sunny exposure, yet the latter must have considerable effect on the annual coal consumption for heating. Has it more or less effect than a windy exposure? Is it better to build at a distance from other structures, which would be wind protectors, to secure a plentiful sunlight; or is it better to sacrifice the sunshine to gain wind shelter?

The test reported in this article offers some interesting information on the subject. Obviously it is difficult to compare heating records of different houses, for the construction can never be regarded as identical. But results observed in the same house from day to day, under varying weather conditions, are of considerable value, provided the house has wind and sun exposures sufficient to be materially affected by changes in these quantities.

The present test was made in an apartment covering the entire second floor of a frame-and-clapboard house. The building faces south and has a length of 60 ft. on this and the north sides. The depth is about 30 ft., and there is a 15 ft. space at the west end and 22 ft. at the east. The apartment is, therefore, especially well situated for this particular experiment. As the long sides are exposed to the sun and the north and northwest winds, with practically no protection (no buildings nearer than 200 ft.), and the rooms are entirely on the second floor, the effects of sun and wind are very noticeable.

The test was made with normal operation of the furnace. The living rooms were kept as near 70° F. as possible and the bedrooms about 60°. Enough coal was burned to maintain this temperature during the day, the fire being banked at night. The heating system was hot-air, the furnace having a 19-in. fire-pot and burning so-called yard-pea anthracite, about the size of No. 1 Buckwheat.

The weather data was secured from the local office of the U. S. Weather Bureau.

TEST OF ROYAL HOT-AIR FURNACE, SERVING SECOND FLOOR APARTMENT, 77 AVON STREET, NEW HAVEN, CONN.

December 6-12. 1915

Date, 24 hrs. period.	Coal burned. (lbs.)	Mean outside temperature, deg. F.	Sunshine, per cent. of possible, hrs.	Average wind velocity. Miles per hr.
Dec. 6	98	30	26	14.2
Dec. 7	69	30	61	10.0
Dec. 8	115	31	0	5.2
Dec. 9	63	32	57	10.0
Dec. 10	98	24	100	20.0
Dec. 11	98	24	97	11.8
Dec. 12	92	25	94	5.6

*Instructor in Mechanical Engineering, Sheffield Scientific School, Yale University.

The effects of wind on the heat loss from the apartment are shown by the results for Dec. 10, 11 and 12. An average wind velocity for 24 hours of 20 miles per hour, as on the 10th, is quite high. On the 11th the velocity was about one-half that of the 10th, and on the 12th about one-fourth. The sunshine for these three days was about the same, as was the outside temperature. And the daily coal consumption required to keep the apartment at the usual temperature was also practically the same, being a little less on the warmer day.

The first four days of the week give an interesting proof of the marked effect of sunshine. The wind and outside temperature were nearly the same, while the sunshine varied from none at all to 61% of the possible number of hours. The necessary fuel consumption varied nearly inversely as the sunshine. The slightly less coal used on the 9th as compared with the 7th, despite fewer hours of sunshine, may be explained by the difference in outside temperature and the fact that on the 9th the period of sunshine was more nearly in the middle of the day, at the sun's greatest intensity. Comparing the results for the 6th with those for the 10th and 11th it is interesting to observe that the longer periods of sunshine on the latter days compensate for a difference of 6° in the average outdoor temperatures.

This test may be criticised for its shortness, and the writer realizes that many more observations should be made to verify or disprove the results. But the perfect consistency of these seven days is certainly interesting and inevitably leads to one conclusion. It may be relevant to state that the weather records were not secured from the Weather Bureau until the week following the coal measurement, so it was not possible to prove a preconceived notion.

From this week's record it is apparently true that wind velocity has very little effect on the heat loss from a reasonably well-built house, and that sunshine plays a very important part in decreasing coal consumption for residence heating. One would be justified, therefore, in exposing a house to fairly severe wind conditions, provided thereby an appreciable increase in direct sunshine was secured.

System of Individual Room Temperature Control.

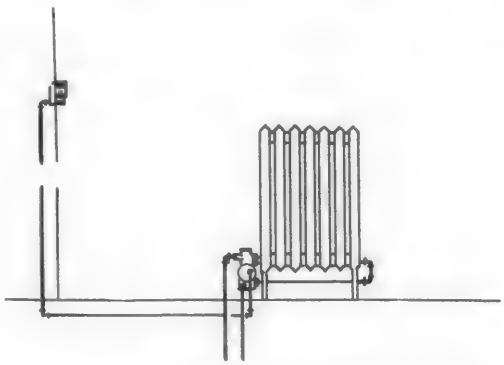
A system for controlling the temperature in a steam radiator and also automatically maintaining the required temperature in the room, has been designed by F. S. Richmond, consulting engineer, 840 Transportation Building, Chicago, Ill.

The main feature of the system is a packless thermostatic control valve on the inlet of the radiator which is operated by the temperature in the return line. The return pipe has no valve and is open direct to atmosphere or into the main vacuum return.

In normal position the supply valve is open and steam enters the radiator until the temperature in the return expands the thermostatic element and the valve is closed. The steam expands in the radiator and condenses until the temperature of the return falls below the predetermined point when the supply valve again opens and the cycle is repeated. As the thermostatic element is very sensitive (being a volatile liquid enclosed in flexible diaphragms), a change of a very few degrees is sufficient to operate the valve.

The valve when placed on the so-called atmospheric or graduated system is hand-controlled and operates as many people believe the ordinary system does; that is, by turning on the valve a little way you get a little heat and the more you open the valve handle the more heat you get. Steam radiation is used instead of water.

Each radiator temperature is controlled independently of the steam supply, whether below or above atmospheric pressure, and requires no balancing as to size of radiator or number turned on. On the atmospheric system, by placing a submerged check valve in the return beyond the valve, it is possible to expand the steam in the radiator down to 10-in. of vacuum even



ARRANGEMENT FOR INDIVIDUAL ROOM TEMPERATURE CONTROL.

though there may be steam pressure on the supply.

On the graduated system with air separator, the temperature of radiator will correspond to the vacuum carried in the system, or with check valves it may at times be lowered.

When operating on a vacuum system the valve is either hand or thermostatically controlled, or both, as desired. The steam is expanded in the radiator from supply pressure temperature down to vacuum temperature, thus preventing any re-evaporation in the return line. By changing the steam pressure from below atmospheric in mild weather to above atmospheric in severest weather with a corresponding high or low vacuum on the return, it is possible to secure the greatest economy in coal consumption.

In addition to the possible economical operation mentioned, a room thermostat is connected to the valve to maintain any desired temperature. The thermostat, 2½ in. x 3½ in., does not require any compressed air or piping, except a single pipe to the control valve, for its operation; it has only two moving parts, and its function is to close or open a simple valve. It has an adjustment for temperature which is not easily tampered with, and a hand shut off which, when opened, leaves the thermostat on its original temperature adjustment.

In operation, when the temperature of the room reaches the desired point, the thermostat closes the valve to the pipe leading to the radiator valve. This allows steam to pass from the main steam supply into the thermostatic chamber and the supply valve is closed by expansion of the thermostatic element. Thus the control valve is kept closed as long as the temperature of the room is high enough to operate the thermostat.

The valve may be used on vacuum or air line systems, or on a two-pipe gravity system by placing an air separator and return tank at the boiler.

Radiating Surface Required to Heat Water in Tanks.

Recently one of New York's prominent architectural and engineering firms, Messrs. Timmis and Chapman, was called upon to figure out the amount of radiation required in a sprinkler tank to keep the water from freezing. The following calculations were made by Walter S. Timmis, of this firm:

A = area in square feet of exposed surface of tank.

K = constant for tank material per degree difference. Note: for 3 in. wood use 0.3; for steel tank use 2.0.

D = difference of temperature of water and outside air.

B = thermal units heat loss per hour from water to air.

L = pounds of steam condensed per hour per square feet of pipe.

T = latent heat of steam (assumed for low pressure at 966).

$B = A \times K \times D$.

Then the total heat units condensed = L T.

And square feet of heating surface = $\frac{A\ K\ D}{L\ T}$

Values of L are as follows:

(From Kent's Pocket Book.)

(*)	Value of L=steam condensed per hour, per square feet of pipe, pounds. Iron	Brass	Copper
50	7.5	12.5	14.5
100	18.5	38	43.5
150	32.2	76.5	87.8
200	48	128	144

*Mean temperature difference between water and steam (sensible heat) deg. F.

Special Standard Threads for Fixtures and Fittings.

The American Society of Mechanical Engineers has published a report of its committee on standardization of special threads for fixtures and fittings on straight pipe threads. The committee was appointed in 1914 and has worked in conference with several manufacturers of electrical and gas fittings. The report consists of 12 printed pages and develops standards for what are described as special straight fixture pipe threads and special straight electric fixture threads. Edward S. Sanderson was chairman of the committee.

Fuel Burning Reports.

Under the title of "Fuel Burning Reports," the American Engineering Co., Philadelphia, Pa., is issuing a series of pamphlets illustrating the performance of the Taylor stoker in plants of varying size and with widely varying operating conditions. It is stated that these results have been obtained by the users of the stoker on the lowest grade of fuels as well as on the highest grade of fuels. No. 1 of the reports has just been issued and contains the records of 30 tests. Size 6 x 9 in. (standard). Pp. 62.

THE HEATING AND VENTILATING MAGAZINE

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THE possibilities for co-operation in engineering and trade matters are well illustrated in the following instance. We received a letter from a prominent engineer in a Southern city asking us if we would send him a model for an anti-smoke ordinance for his city. "We have just gone through a $6,000,000 fire," he wrote, "and the building laws are being changed. Numbers of buildings were in this fire district which should have smokeless boilers and if I had the proper data to put before our city fathers, I think I could get this through at this time. Just now the cry is, 'Rebuild right,' and I think for office buildings, etc., which burn soft coal, the smokeless boiler should be installed. Kindly tell me what you think of this and the success of same in other cities which have such laws."

By referring this matter to a man well qualified to offer suggestions on this subject we were able to forward to our correspondent the information that Bulletin No. 49 of the Bureau of Mines, Department of the Interior, contains a very complete digest of the smoke ordinances of the country, and we were also able to send him a suggested smoke ordinance drawn up by Osborne Monnett, of Chicago, based on four years' experience in administering the Chicago smoke ordinance.

The ordinance as drawn up is especially adapted for a small city and so well covers the ground that we have struck off a few extra copies which are available, on request, to those interested in securing such a code for their city.

We should be glad at this time to present the sequel to this story and state that our correspondent had been successful in securing the passage of the desired ordinance. That is another story, however, as the matter is still in its initial stages. But there is certainly something to be said in favor of the initiative shown by our correspondent and the splendid co-operation displayed by the man having the desired information.

WE are planning to make the July issue of THE HEATING AND VENTILATING MAGAZINE an air conditioning number. For this occasion articles have been prepared tracing the development of air conditioning during the past decade, the present state of the art and some notes on the future of this field. There will also be several articles illustrating present practice in different branches where air conditioning is accomplished in connection with heating and ventilation, the whole, it is hoped, forming a fairly complete manual on the subject.

THE publication of the weather charts in the present issue concludes the 1915-1916 series. The charts will be discontinued, as usual, during the summer months and their publication resumed in the fall.

NATIONAL DISTRICT HEATING ASSOCIATION

Proceedings of Eighth Annual Convention, New York, May 16-19, 1916

Complete confidence in the future of the central station heating industry; closer co-operation on the part of the utility company, the public service commission and the consumer; and, finally, the coming invasion of the East with the district heating idea, were three keynotes that were expressed in no uncertain tones at the eighth annual convention of the National District Heating Association. The meeting was held in New York, May 16-19, 1916, at the Hotel Martinique. It may have been due to its sessions in the metropolis which brought about the allusion to the "Eastern invasion," but the idea was expressed by Arthur Williams, commercial manager for the New York Edison Company, when he declared that eventually New York City would be heated throughout from central heating stations.

BYRON T. GIFFORD, GRAND RAPIDS, MICH.
President, National District Heating Association.

The assured future of the industry was also expressed by Mr. Williams and was brought forcibly home to the delegates by Secretary D. L. Gaskill in an impromptu address that was described as one of the "hits" of the convention.

The notable address of Travis H. Whitney, one of the public service commissioners from New York City district, emphasized the great need of a better understanding on the part of the utilities and the commissions, when, he declared, it would be found that they were both working for the best interests of each.

The convention met under unfavorable weather conditions, the first two days of the convention being cold and rainy.

Morning Session, May 16.

President Davis S. Boyden called the convention to order and introduced Marcus M. Marks, president of the Borough of Manhattan, who made the welcome address.

Mr. Marks said the danger to the American business man is in making his business an end of life rather than a means of life. Moreover, business men are not taking active measures to show their power in government. We see

lawyers in legislatures, everywhere, but the business men as a class are devoted to their offices, their factories and their shops.

Mr. Marks said self-sacrifice was the needed slogan in public life. The business men of the country need to be aroused and then, but not till then, shall we have good government. The business men of the country, as well as the lawyers, should be our mayors and our members of congress.

The government, he said, does not represent the sentiment of the business community today because the business men are not more active in political affairs. "I urge you," he said, "to take office whenever the opportunity offers. Get into public life."

First Vice-President Byron T. Gifford responded to the address of welcome and endorsed the recommendation of the borough president that business men generally, and especially members of the National District Heating Association, should make a serious effort as managers of public utilities, to take a more active part in public life.

Mr. Gifford also called attention to the fact that the New York Steam Company's plant was one of the sights of the city to association members, being easily the largest district heating system in the country, with 4,200,000 sq. ft. of direct radiation connected and furnishing no less than 2,500,000,000 lbs. of steam per year.

The report of the executive committee was read by Secretary D. L. Gaskill, who presented the names of a number of candidates for active and associate membership. On special recommendation Professor John R. Allen, of the University of Michigan, was elected to honorary membership. On motion the candidates for active and associate membership were elected.

PRESIDENT'S ADDRESS.

President Davis S. Boyden then presented his address:

As president of your association, it is my privilege to address you at this, your eighth annual convention, being held in the largest city of our country. It must be a source of gratification to the founders and charter members of this association who have witnessed the rapid growth, success and accomplishments attained by the association in the comparatively short period of its existence.

The farsightedness of these gentlemen is evidenced in the report of the organization meeting held at Hotel Boody, Toledo, O., on July 15, 1909, when, after considerable discussion, it was decided the association should be national in its character, rather than confined to a local or geographic section.

At this meeting were also pointed out the great possibilities of improving the district heating industry, including the many accessories and appliances so essential to its economic and profitable development.

It was predicted that the activities of the association would be an asset to the electrical industry, in the securing of large contracts for electrical energy.

These important points were touched upon at this first meeting, the minutes of which are recorded in less than two pages of our proceedings. To my mind, this is a terse outline of our most vital functions. That the several past administrations have carried out these ideas in an able manner is clearly shown by a perusal of our transactions, which have become a text-book on district heating enlarged upon and brought up to date annually. Great credit reflects upon those who, at the sacrifice of time and money have contributed to these valuable works. The transactions are the back-bone of the society's power, and the reference of authority for all interested in the manufacture, distribution and consumption of heat. The field of study has not been confined to that of heating alone, but includes all uses of steam, such as the requirements of prime mover process work and cooking. Along all lines there has been extensive research. Data on construction and operation have been collected, compiled and recorded in such form that it may be used on a comparative basis by any member. It is hardly necessary to elaborate on the magnificent work which has been accomplished.

In the early days of the association, the securing of new members was not an easy

task. However, the membership at large co-operating with their officers, was the solution of the problem, and a widespread campaign resulted in securing a sufficient number of members to insure the permanency of the organization from the very beginning.

I am also able to congratulate you upon that which I believe to be more important that numbers—and that is—the fact that this association is rapidly becoming the center of all matters pertaining to the arts which depend upon the application of heat, and that our proceedings are watched with growing interest, not only by the whole steam public of this country, but also abroad.

We may say that the National District Heating Association has come into its own—and no longer does our association seek to profit from its members, but, on the contrary, members seek and receive profit from the association.

We have, at the present time, 364 members, and the field of prospects has hardly been approached. The National Electric Light Association, undoubtedly the greatest of industrial associations to-day, closed the sixth year of its existence with 259 members, or 105 members less than we have at the present time.

Turning to the industry, we do not find the universal confidence and appreciation in district heating as exhibited in other public service commodities. This is not at all singular when you stop to consider conditions. Obviously, a district heating plant to operate successfully must have, first, a field which is highly developed. A field of this character usually affords the comforts of modern heating which is rendered to the occupants with more or less satisfaction. So, it could hardly be expected that the general public would have a full appreciation of district heating service. The producer and consumer of heat are the ones most vitally interested in district heating, and never fail to show their appreciation of the service after once being connected to such a system.

This silent servant, which contributes intermittently to our comforts, dates from antiquity, and it is not surprising that in this age it does not receive the prominence of our modern utilities. Not unlike the early days of the gas and electric development, there were failures in the industry In these instances the cause has been clearly shown, and the industry profited by the experience.

THE PLANT OF THE BOSTON HEATING CO.

Undoubtedly the most gigantic district heating failure occurred in Boston, in the year 1887. The Boston Heating Company, as it was called, proposed to circulate water under pressure having a temperature of approximately 450° F., this water entering a receiver on the customer's premises flashed into steam, the pressure being controlled by a diaphragm which regulated the in-flow of hot water to the receiver. The distribution system comprised upwards of 10,000 ft. of mains, enclosed in a brick tunnel 18 in. in diameter, the supply pipe being 4 in. and the return pipe 12 in. in diameter, mammoth pumps being used to keep the water in circulation through the pipe lines and heater. It was contemplated that 1,000 buildings aggregating 130,000,000 cu. ft. of space, would be supplied with heat, power and hot water service. To avoid the irregular contour of the surface, a fixed grade for the pipe line was established, necessitating the tunnel to be constructed in some places to a depth of 27 ft. below ground. The insulation applied to the pipes was an untreated asbestos paper, similar to that used at the time for inside work. Great difficulty was experienced in keeping the system tight, and the plant ceased to do business after eight months' operation.

Probably there have been other more or less unprofitable ventures made, and these instances have proven valuable object lessons.

The most discouraging effect resulting from these failures has been the pessimistic impression imposed upon the laymen, to whom we look for financial support.

Subsequent to the period cited above, constant progress has been made in both systems and structures employed for the distribution of heat, and the many successful plants now in operation are rapidly dispelling the pessimist.

It would be ungrateful, indeed, if we did not make creditable mention of the manufacturers, who have contributed much to our present success by the supply of proper systems, fitting accessories, and

measuring devices. In this respect, we may assume to be better provided for than are other utilities, as there are large establishments specializing in products used exclusively by the district heating industry.

That the approval and confidence of the public in district heating is fast being restored, is forcibly brought to our attention by the constantly increasing number of new companies, together with the rapid growth of those already established.

To create a universal demand for distrist heating, we must educate the public in its possibilities, such as the conservation of our natural resources, elimination of smoke, increased health and comfort to our people, etc.—and last—the security of our investments. The present publications of the society, with the assistance of the trade journals and the daily press, are doing excellent work in this direction.

SUGGESTION FOR LECTURE BUREAU.

I wish, however, to recommend for your consideration the establishment of an extensive committee or bureau, whose duties it would be to impart information by lecture or literature to communities, municipal agents, boards of trade, financial interests, boards of directors, and other similar civic bodies, bearing on the modern district heating system. The members on this committee to be selected with reference to their geographic location and qualified by their successful experience in steam or hot water heating.

I believe we should join the National movement in the prevention of accidents, and appoint a committee to study the accidents and their prevention as peculiar to our industry.

I suggest that a committee on constitutional amendments be appointed to study and recommend any changes in the constitution or by-laws, which may more adequately cover the association's present interests; this report to receive the endorsement of the executive committee before acted upon by the association.

I recommend that the special committee appointed to prepare a geographic and individual classification index of the membership be continued and the roster in this form mailed to each member.

During the year there has been inaugurated the National District Heating Association Bulletin, the official organ of the society. Three issues of this bulletin (which is published quarterly) have been mailed to each member. The publication committee has outlined the policy and assumed a general supervision over the editorial and advertising columns. The editorial committee has furnished generously both reading and advertising material, and, under the direction of and assisted by their chairman, attended to the business details in their respective localities.

The benefits created and accruing as a result of the Bulletin are far-reaching and of inestimable value. It is an unabridged encyclopedia of our art, embracing the business and social activities of the society. That the Bulletin has become a fixture in our organization is extremely gratifying to the administration.

Secretary-Treasurer D. L. Gaskill reported receipts for the year of $5,869 and expenses of $5,558, leaving a balance on the year's operations of $311.

The association has a membership of 354, consisting of 182 Class A members, 71 Class B members, 23 Class C members and 78 Associate members.

Secretary Gaskill gave a detailed report covering the publication of the association's quarterly Bulletin, showing a slight profit on the three issues already published and prospects of increased profits on future issues. The Bulletin, he said, had more than justified its existence and has fully proved its value to the members. Starting with a small advertising patronage, the Bulletin will carry in its next issue at least fifteen pages of advertising, insuring its financial success during the ensuing year.

It was stated that a topical index of all of the Proceedings of the Association had been compiled up to and including 1915. It is planned to reproduce this index in Volume 8 of the Proceedings, which will shortly be issued.

A list of the association's members by companies and occupations has also been compiled by R. D. De Wolf and was distributed at the convention.

President Boyden appointed as the nominating committee S. Morgan Bushnell, chairman; R. D. De Wolf, A. C. Rogers, George W. Wright and J. H. Walker.

REPORT OF PUBLIC POLICY COMMITTEE.

The first of the technical reports was then presented by the public policy committee, D. L. Gaskill, chairman. This report was devoted to the matters of committee work of the association, costs and accounting, franchises, welfare work, medical examination, rates, and purchasing supplies. The point was made that there is danger in committee work of covering too wide a ground. Fewer lines of force were recommended and more intensity along those followed.

On the subject of franchises the committee found that it was not practicable to prepare a model franchise for the use of heating companies, owing to the fact that no one form would be adapted to all States. It was found to be better to speak of some of the things which should or should not be in the franchise.

In preparing franchises there is usually no trouble but what there will be enough in them. Municipal bodies and their solicitors and the companies and their lawyers will not usually err in this direction. The trouble usually is in what they have put in, not in what they leave out.

The committee makes the following suggestions this year. Do not accept a franchise covering the entire municipality in which you are located. Specify definitely the parts of streets and portion of the municipality that you desire to serve, leaving future extensions to be covered in future grants. The reason for this is obvious. Where the franchise covers the whole municipality, governing bodies are ready to require unprofitable extension to satisfy popular clamor, without thought of the losses that may be incurred. While relief may generally be had from such orders through the commissions, it is better to be in a position to refuse to accept the franchise offered than fight to get rid of its provisions before some court or tribunal. Where franchises must be accepted covering the whole of a municipality, provision should be contained therein that would fully protect the interests of the company in making unprofitable extensions. No extension should be required under a franchise unless the immediate income from such extension would be sufficient to pay for the extension in the time as below stated. Without such condition, sooner or later unprofitable extensions will be demanded.

Whether or not to accept a franchise or order for an extension is oftentimes a difficult problem, as the territory to be served is often close to the border line between profit and loss. The committee was of the opinion that such extensions should bring in such immediate gross income as would pay for the extensions in five years, or a yearly percentage basis about 20 per cent. It was recommended that this suggestion be investigated and reported upon by some one of the standing committees.

Franchises should have some definite date for termination unless granted under some indeterminate law of the State in which the company is located. Many franchises have been created with no language therein specifying when they were to end or saying that they were to be perpetual. Many of the holders of these grants believed them to be perpetual franchises, but courts have been holding that when there was no language in them designating or indicating that they were to be perpetual or for a term of years, the grant was revokable at any time at the will of either the municipality or the company. Heating franchises should be long. The high cost of installation does not warrant accepting short term franchises, and we recommend that no franchise be accepted less than twenty-five years and they should be longer.

Franchises should provide for adequate space to be occupied in the installation of steam pipe lines, insulating covering, etc., and should also provide for quick and easy accessibility to the heating mains without the necessity of special permits from governing bodies. In some cases where steam is to be transmitted by high pressure it is advisable to have pipes in small concrete or brick raceways which will permit inspection of the pipe at all times, and there should always be provided enough space so that the proper size of pipe could be used for economical operation.

Franchises should not be accepted where they require compensation to be paid for the use of the streets of the municipality as the cost of municipal compensation added to the cost of construction and operation may seriously in-

terfere with the success of the undertaking, there being in many instances a comparatively narrow margin of safety from the financial standpoint. The advantages to the community in having district heating plant service, doing away with the inconvenience and trouble connected with independent furnaces and doing away with the smoke evil, will in a large measure compensate the municipality for the occasional inconvenience caused by opening streets for repairs or pipe line construction.

In speaking of rates the committee stated that the time is ripe, on account of the high cost of all materials entering into the heating business, to permit and justify an advance in rates wherever franchises and commissions will permit it.

President Boyden appointed as a resolutions committee Thomas Donohue, chairman; Fred. B. Orr, C. H. Spiehler, C. R. Bishop and C. N. Green.

REPORT OF EDUCATIONAL COMMITTEE.

A report of the Educational Committee was then presented by George W. Martin, chairman. This report dealt largely with the use of low pressure steam in cooking apparatus. The tests covered in the report were: "The Establishment of Standard Heating Apparatus with Special Reference to Low Pressure Steam," by J. W. Wattles of the Edison Electric Illuminating Co. of Boston; "Tests on a Copper-Jacketed Kettle Under Various Conditions of Pressure," by J. H. Walker, of the Detroit Edison Co.; "A Study of the Heating Effects of Various Steam Pressures Applied to the Printers' Wax Pot," by Herbert Kennedy of the New York Service Co., and "Test of the Steam Consumption and Electrical Requirements of a Hotel Laundry," by E. F. Tweedy of the New York Edison Co., the latter test being of the installation in the Hotel Martinique.

The committee expressed the opinion that the steam consumption for restaurants be reduced to an amount per meal or per person, and the steam consumption for laundries reduced to an amount per thousand pieces or similar unit. Other steam-using operations can doubtless be reduced to a similar basis.

In discussing the report the use of steam for cooking purposes was pointed out as one of opportunity for the central station heating engineers. The problem, it was shown, was centered largely in the adapting of steam at low pressure for this purpose. One speaker stated that such an installation may now be seen at the Travers Island clubhouse of the New York Athletic Club, where all of the cooking is now being done with low pressure steam. Mr. De Remer spoke of a similar practice in San Francisco, where pressures of 3 lbs. or lower were found sufficient for cooking purposes. He stated that it was necessary to educate the manufacturers and users of this type of apparatus through the influence of competition to take up the use of low pressure steam.

Afternoon Session, May 16.

At the opening of the afternoon session the report of the Underground Construction Committee was presented by J. H. Walker, of Detroit. This report included descriptions of several methods of making heat loss tests from underground pipe conduits, such as heat loss from bare pipe in soil, an insulation test conducted by the Public Service Company of Northern Illinois, the careful methods used by the American District Steam Company, as well as the well-known methods employed by the Armstrong Cook Company. Other features of the report were suggestions for testing steam conduits, contributed by W. M. Sawdon, a description of the testing plant of the Detroit Edison Company, a general description of the testing equipment at Purdue University and also of the steam pipe covering plant at the University of Wisconsin.

In connection with the latter tests it was pointed out that the scientific method of conducting a research is to first ascertain what variables are likely to affect the results and then, keeping all constant but one, to vary that one between wide limits to observe its effect. Each of the others in its turn is treated in the same way.

An interesting discussion of the report was contributed by W. H. Wells, president of the American District Steam Company.

HEAT INSULATION TESTS.

For the last three or four years I have devoted considerable time to testing the efficiency of various forms of insulation.

One fundamental truth which has forced itself upon me from the first has been that with no insulation at all other than a vacuum you have the best, provided it is confined; next to that the lighter gases, such as highly rarified superheated steam, form the best insulating mediums; and after that, the atmosphere itself.

Condensation losses may be classified as convection losses, those due to conductivity, and those due to radiation.

Convection losses are relatively small underground, because there is practically no circulation of air.

Losses from radiation underground do not exist in the same proportion as they are encountered in the air.

Losses from conductivity underground are considerable, but we have not made any experiments as to these losses as tests made underground are much more difficult to make than laboratory tests or those which we have conducted of various forms of insulation in a closed room. In a closed room, with the test lines raised several feet above the floor, conductivity losses are reduced to a minimum and the convection losses practically do not amount to much. In tests made in closed rooms the only condition under which you find convection losses serious is where you test a steam pipe without any insulation. This test is scarcely a fair one, because the heat from the pipe creates currents of air which by bringing constantly supplies of cool air in contact with the pipe materially increases the condensation in the pipe.

The best insulation ordinarily available is the atmosphere itself; but the insulating effect of the air is not in proportion to the amount.

Two-inches of air insulation will give you no better results under ordinary conditions than 1-in. If you have an air space of 1¼, 1½ or 1¾-in. the insulating efficiency is little if any better than with an air space of 1-in.

This air space is a better insulator than anything else you can get; but care must be taken to prevent the air from circulating, and at intervals along the line which is being insulated partitions should be provided to prevent any circulation of the air.

Higher insulating efficiency is obtained from the air space than from any insulating material. Various materials may show high efficiency taken independently; but you will obtain a much higher degree of efficiency if you maintain 1-in. of air space and supplement this with other insulating material to confine the air. If you should fill the air space with any insulating material you would lose insulating efficiency, because the conductivity loss from the material used to fill the air space is greater than it is through the air itself.

It is customary to speak of line losses as amounting to a certain weight of steam per hour per square foot of surface. This statement is generally misleading because the amount of condensation or line losses in different sizes of pipe varies considerably. If you have in your system of underground mains steam pipes of 4, 6, 8, 10 and 12-in. sizes the line losses in the larger sizes of pipe per square foot of surface is much less than in the small sizes of pipe; and it is most incorrect to refer to line losses as amounting to so much per square foot of surface per hour without at the same time stating the diameter of the pipe.

It is this difference between the condensation loss in large sizes of pipe and small sizes of pipe under similar conditions which makes it impossible to place absolute reliance on the results which are obtained in laboratory tests, as such tests are made with small sizes of pipe and the line losses are generally calculated from the condensation obtained in that pipe, and proper consideration is not given to the fact that in practice the line losses would relatively be much less in the larger sizes of pipe which are used in extensive underground systems.

One cannot make any positive statements with regard to what the line losses will be in any system unless the sizes of pipe and the pressures under which they are operated are known.

Another point to be taken into consideration in determining the amount of line losses should be the temperature of the steam conveyed in the pipes. It is common to speak of the steam as being carried at given pressures, and efforts are

made to determine the relative line loss due to differences in pressure. This relative difference does not vary in proportion to the difference in pressure, but in proportion to the difference in the temperature of the steam, and the heat losses in the pipe are always relative to the difference between the temperature of the steam and the temperature of the surrounding medium.

To figure these losses steam at 100 lbs. pressure should not be compared with steam at 10 lbs. pressure, but steam at the temperature due to 100 lbs. should be contrasted with steam at the temperature due to 10 lbs. pressure. The difference between the temperature of the steam and the surrounding medium determines the condensation losses, and this difference is governed not by the difference in the pressure of the steam, but by the difference in the temperature of the steam.

The report of the Nominating Committee placed the following in nomination, all of whom were elected at a subsequent meeting:

NEW OFFICERS.

President, Byron T. Gifford, Grand Rapids, Mich.

First vice-president, George W. Martin, New York.

Second vice-president, J. H. Hecht.

Third vice-president, J. C. Hobbs, Pittsburgh, Pa.

Secretary-treasurer, D. L. Gaskill, Greenville, O.

Members of executive committee: C. A. Gillham, of New York, and A. E. Bettis, Kansas City, Mo.

The first technical paper of the meeting was presented by S. Morgan Bushnell, on "Factors in the Growth of District Heating."

This paper reviewed some of the more prominent factors in the development of the central station heating industry, starting from the early days of the art forty years ago. Reference was made to the organization of the American Radiator Company in 1899, whose tangible assets have increased from $8,584,000 in 1899 to more than $26,000,000 at the present time.

He also quoted from data gathered by the American District Steam Company showing that over $60,000,000 has already been invested in central steam heating plants. This, it was explained, referred exclusively to underground construction.

Mr. Bushnell also discussed the development of smoke prevention and quoted from a recent government report in proof of the statement that the central station heating plant is one of the most important factors in reducing smoke and soot.

A lively discussion followed the reading of this paper, the speakers including Past Presidents Wright, Wetherell and De Wolf, and C. L. Hecht and C. R. Bishop. Mr. Hecht urged the development of the use of gas as a heating medium, his idea being that this was one of the things that would have to be seriously considered in the near future. All of the speakers took an optimistic view of the outlook for central station heating, although the opinion was expressed that the greatest opportunities lay in the heating of business, rather than residence, districts. Regarding the use of gas for heating, Mr. De Remer called attention to a fundamental factor in connection with gas heating. In New York, for instance, with gas at 80c. per 1000 cu. ft., the total B.T.U. amounts to 600,000 B.T.U., while 1000 lbs. of steam costs 60 cents and contains 1,000,000 B.T.U.

Other speakers referred to the importance of securing adequate rates, which, it was shown, were still too low in many localities.

Morning Session, May 17.

After passing on a number of routine matters, including the formal election of officers, as put forward by the nominating committee, the convention took up a further discussion of the report of the educational committee.

The report of the station operating committee was then presented by Byron T. Gifford, chairman. Three general subjects were considered in the report, consisting of sections on boiler operation, illustrating a method of efficiently carrying a load on a boiler by means of indications afforded by a set of switchboard instruments; water treatment, its cost and results obtained from it, also the effect

of caustic soda on iron and steel; and extraction or bleeder type turbines, discussing the value of extracting steam, the reduction in production cost due to this type of turbine under certain conditions. The report also contained a general discussion of oil as fuel, showing results to be obtained and the possibility of future development with oil as fuel.

Pending the discussion of this report the convention listened to an address by Arthur Williams, general commercial manager of the New York Edison Company, on "District Heating and Its Relation to Electric Utility Operation." Mr. Williams proved himself an ardent champion of the central station heating idea and predicted a brilliant future for this industry, stating, among other things, that he expected to see central station heating in New York developed to such an extent as to be practically universal.

Following Mr. Williams's address the station operating committee's report was discussed by Joseph Harrington, A. E. Duram, S. Morgan Bushnell and L. E. Shaw, who told of recent developments in bleeder turbine design.

Morning Session, May 18.

At the opening of the Thursday morning session a paper was presented by William J. Baldwin, Jr., chief engineer of the New York Steam Company, on "Co-operating with Consumers." This proved a most interesting account of the problems and other difficulties that arise in dealing with the average user of steam from a central plant, especially in the case of residences. Mr. Baldwin's paper is reproduced in full on another page of this issue.

Mr. Donnelly spoke of a case where the supply and return connections to the steam radiators in the building were of the same size and, the connections being made when the system was not in use, it was found later that the air valves were at the wrong end of the radiators. This, he said, was an instance of the need of co-operation to show the consumer that the fault is often not in the service itself.

Mr. Baldwin, in closing the discussion, mentioned a practice that had been adopted by the New York Steam Company in making estimates of the theoretical steam requirements of its different customers and checking these with the actual consumption. Then if the consumption figures were found to be running high the company's inspectors immediately began an investigation to learn the cause and, if possible, to correct it.

President-elect Byron T. Gifford was then called to the chair and took advantage of the occasion to express his appreciation of the honor conferred upon him. He pledged his efforts towards the advancement of the association's interests, especially in the way of wider committee activities which he considered of the first importance.

The discussion of the station operating committee's report, which had been cut short at a previous session, was continued by Mr. Harrington, who explained in detail the new form of side wall construction for boiler settings, in which use is made of a course of silocel to reduce the heat losses through the side walls. Another speaker showed that the transmission through a 25-in. wall of No. 1 firebrick was at the rate of 872 B.T.U. per square foot per hour, while with the silocel construction, with the wall 19½-in. thick, the rate of heat loss was only 338 B.T.U., showing a saving of 61%.

The morning session was concluded with an address on "Appraisals of Utility Property," by M. F. Millikan, vice-president of the American Gas and Electric Co. This was a thoughtful discourse on the matters of utility valuations for the purpose of rate making and taxation. At the conclusion of the address a vote of thanks was tendered Mr. Millikan by the Association.

Thursday Afternoon, May 18.

A comprehensive report of the rate committee was presented at the opening of the Thursday afternoon session by A. E. Bettis, chairman. This report contained data relative to heating rates similar to the data that were collected by the association committee of 1912. These data were compiled in such a way that comparisons can be readily made between the former and present data collected, showing changes that have been made by the various heating companies throughout the country.

It was shown that the general tendency is to increase heating rates. This refers both to flat and meter rates. Ten steam companies which filed reports have aban-

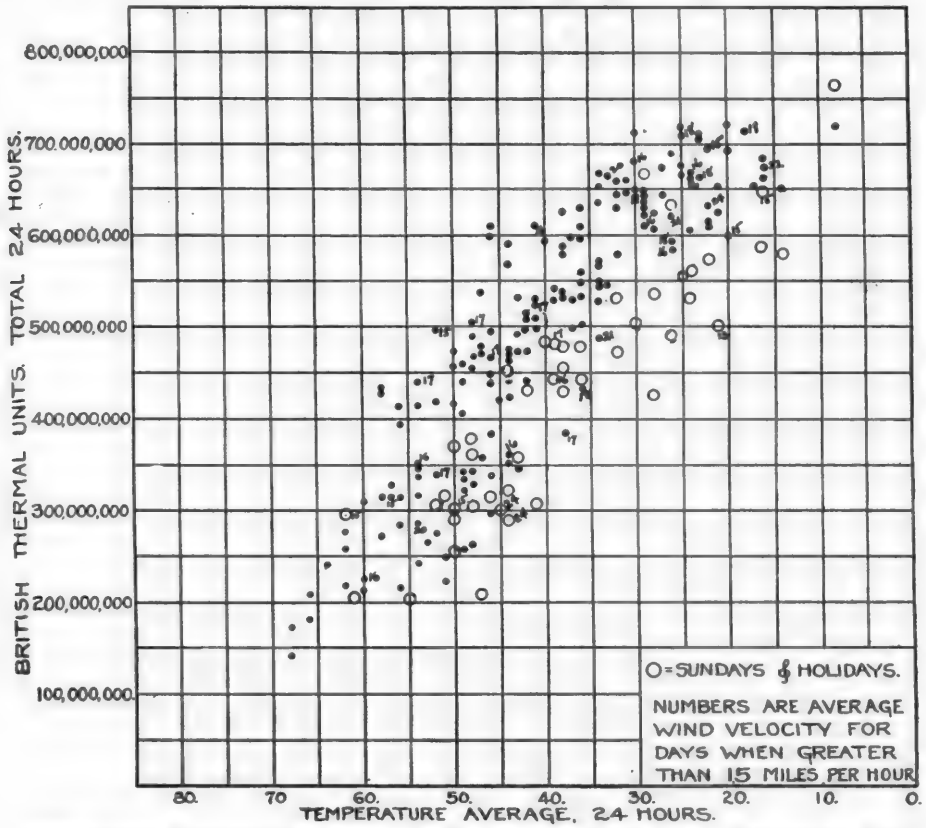
doned flat rates entirely. Two steam companies raised the flat rates they had, while five companies raised their meter rates. In regard to hot water companies, there were five companies that increased their rates. The report was supplemented with a statement on the theory of rates.

Mr. Gifford urged the members to avoid the use of the term "discriminating rates" in speaking of varying charges for steam heat, as these rates are not discriminatory, but are strictly on a par with wholesale and retail prices in other lines of business.

Mr. Partridge cautioned the members to have their cases fully prepared when appearing before public service commissions to have their rates raised or maintained, and he pledged the support of the association to any member who required financial assistance in preparing his case. The sentiment expressed by Mr. Partridge was greeted with applause by the convention.

The first paper scheduled for the afternoon session was then presented by Walter J. Kline on "Ratio of Economizing Coils of the Different Types of Heating Systems."

The author explained that economy coils are another name for cooling coils because the water of condensation must be cooled in order that the available heat can be utilized. But as this process is merely incidental, it is important to use the more descriptive appellation.



RELATION BETWEEN TOTAL B. T. U. SUPPLIED TO A BUILDING AND OUTSIDE WEATHER CONDITIONS.

As used in central station heating practice economy coils are a necessary auxiliary to adapt existing piping in buildings to an outside steam supply. It is briefly an indirect radiator, arranged so that all condensate from the individual heating system must pass through it.

The author went on to describe the different kinds of heating systems making use of economy coils and gave data for figuring the sizes of the coils and notes on methods of connecting them. The paper closed with figures on the savings

effected through the use of economizing coils, these savings running from 7 to 16 cents per square foot of coil surface with steam at 50 cents per 1000 pounds.

Mr. Wetherell stated that in his practice he found that the use of additional radiation served the same purpose as the cooling coil, one of the disadvantages of a cooling coil, especially in large installations, being that it had to be broken up into several sections serving as many registers, in order to avoid the overheating of the air.

Mr. Kline expressed his agreement with Mr. Wetherell in the latter's statement that the use of an Atmospheric system served the purpose of the cooling coil and in a better manner, but that in the case of systems already installed the cooling coil was more easily available, as compared with an Atmospheric system.

E. G. Bailey then presented a paper on "Methods by which Harvard University Buys Steam on a Heat Unit Basis." The first portion of the paper was given over to a description, with illustrations, of the extensive steam heating system by which heat is supplied to some 25 buildings containing a total volume of 14,704,557 cu. ft., the steam being carried in tunnels from the power station of the Boston Elevated Railway Co. Payment for steam is based upon a capital charge which is dependent upon the demand, plus a service charge of so much per boiler horsepower.

The meters selected for metering the steam were the Bailey fluid meter of the orifice type (described in THE HEATING AND VENTILATING MAGAZINE for May, 1916). Return meters were used, also of the Bailey weir type, utilizing a V-notch. The average pressure and temperature of the steam determined the B.T.U. per pound, which, multiplied by the total flow, gave the total B.T.U. delivered.

The accompanying figure is a plot of the B. T. U. supplied to the building of Harvard University and the outside temperature, taking individual days during the heating season 1915-16. Sundays and holidays are shown as circled points. The numbers near some of the points correspond to the average wind velocity for the days when it exceeded 15 miles per hour.

The B. T. U. as given are the gross supplied, and about 12 per cent should be deducted for the net. The slope of the average line corresponds to about 9,000,000 B. T. U. net per day per degree change in temperature, or about 1.6 B. T. U. per day per cubic feet of building heated. This corresponds to about 20,000 cubic feet per horse power for a 70 degree difference between outside and inside temperature. Several of the buildings in the College Yard do not have their entire volume thoroughly heated. All of the newer buildings are provided with weather strips, but double windows are not used.

The Freshman Halls comprise about 23 per cent of the total volume of all buildings heated, while they take about 33 per cent of the total heat. This difference in ratio of heat to volume is accounted for by the fact that the Freshman Halls are heated all of the time and a considerable amount of steam is used for service water and cooking.

Morning Session, May 19.

Travis H. Whitney, Public Service Commissioner of New York City, was the principal speaker at the Friday morning session, making a carefully-prepared address on the relation between public service commissions and utility corporations. Mr. Travis urged a greater confidence on the part of the utility companies in the work and rulings of the public service commissions, and emphasized the point that the commissions were attempting to serve the utilities as well as the public.

The report of the meter committee was presented by F. B. Orr, chairman. This report took up the changes and developments of the past two years. Several types were described, including the Tyler and Cranetilt types, the Bailey fluid meter and the velocity type steam meter brought out by the Foxboro Company under the name of Foxboro. Several developments of some of the older meters were also described and this was followed by suggestions for the metering departments of central station companies, containing notes on the selection of meters, number of meters required, and inspecting and testing.

The report concluded with a recommendation that manufacturers be asked

to furnish examples of their meters which can be tested by a future meter committee.

Before the convention adjourned a number of resolutions were passed expressing the thanks of the convention to the retiring officers and to the various committees.

The Entertainment.

A pouring rain on the opening day of the convention interfered with the proposed automobile tour to Long View, but the committee was equal to the emergency and provided closed cars which took the ladies around the downtown streets of New York and across the Brooklyn Bridge. The ladies came back with glowing accounts of their ride which proved all the more interesting in having no definite route.

The next day, Wednesday, was the day of the boat ride around Manhattan Island. The party left on the Nassau from the foot of East 34th street, immediately after the close of the morning session. A buffet luncheon was served on board. Proceeding up the East River, the Nassau steamed past Blackwell's Island and then swung into the Harlem river, passing through no fewer than twelve draw bridges before reaching Spuyten Duyvil. The opening of the draws, however, was a source of great interest, holding the attention of the travellers equally with the other sights of the river. Passing into the Hudson River the party was taken down past the interned German steamers and thence into the Upper Bay, permitting a close view of the Statue of Liberty and Ellis Island.

Passing around Governor's Island, the Nassau came back up the East River, under the Brooklyn and Williamsburg bridges. A detour was then made toward the Brooklyn Navy Yard where several of the battleships could be seen at close quarters.

Thursday morning, the third day of the convention, the ladies were taken to the Metropolitan Museum of Art, and in the afternoon to the Hippodrome. For the Hippodrome trip each lady was presented with a box of bon-bons with the compliments of the New York Steam Company.

The convention banquet was held the same evening. An unusual feature of this banquet was the presence at the head table of all of the past presidents of the association, the retiring president and the president-elect. A. S. Armagnac, chairman of the banquet and dance committee, acted as toastmaster.

At the close of the dinner, during which the cabaret girls from the Silhouette Room of the Hotel Martinique, entertained the diners, Secretary D. L. Gaskill was introduced and made a short address in connection with the presentation of gold medals to all of the past presidents. Immediately upon the accomplishment of this duty the retiring president, Davis S. Boyden, sprung a surprise by presenting a similar gold medal to the secretary. The diners enjoyed the situation immensely, and expressed their pleasure by heartily applauding Secretary Gaskill. He frankly confessed that the executive committee "had put one over" on him and expressed his thanks for the honor conferred on him.

H. A. Austin, the "poet laureate" of the association delivered a poetical "skit" on past presidents in general, which brought down the house.

The speaker of the evening, Reginald Pelham Bolton, was then introduced, his address being on "Revolutionary Relics on Manhattan Island" Mr. Bolton spoke with the aid of lantern slides. He proved full of his subject and held the close attention of the diners while he told of the many interesting finds in the upper part of the island, many of them being shown on the screen. The appreciation of the diners was expressed by a standing vote of thanks for his intensely interesting address.

The diners then proceeded to the Garden where dancing was in order until a late hour.

Friday morning, with improved weather conditions, the trip to Long View, originally planned for Tuesday, was carried out under sunny skies and proved a great success.

With the Exhibitors.

The convention exhibits overflowed the hall assigned to them and a number were located on each side of the main corridor. The booths were formed of white wood, with a trellis effect, making a most attractive appearance. A considerable number of the devices exhibited were practically new to the trade and represented the notable advance that has been made during the past year in the development of the practical side of the industry.

H. W. Johns-Manville Co., New York, had a display which included samples of J-M sectional conduit for the underground insulation of steam and hot water pipes; also J-M pipe and boiler insulation, J-M steam packing, the J-M steam trap and

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J-M fibre conduit. The company was represented by F. J. Medway and J. H. Olden.

RicwiL Co., Cleveland, O., showed a model of the RicwiL underground pipe conduit, consisting of a cross section of two types of installation, single and multiple. C. Gottwald, secretary and treasurer of the company, was present, as well as F. H. Stevens, engineer, and C. M. Stokes, eastern representative.

Armstrong Cork & Insulation Co., Pittsburgh, Pa., exhibited a model illustrating the application of Nonpareil high pressure covering to underground steam lines and the roller supports for the same purpose. Another model showed the application of Nonpareil insulating brick to the drums and setting of a water-tube boiler. The interests of the company were in the hands of C. A. Senter, of the New York office.

Jenkins Bros., New York, had an attractive booth where the company's hospitality was dispensed by William G. Le Compte and Frank Martin, of the home office. The company's exhibit included a full line of radiator valves, including a fractional supply valve and an impulse return check. Samples of the company's line of gate valves, standard, medium and heavy, were also shown. A regular valve fitted with a sprocket sheath wheel and hand chain attracted much attention. An electrically-illuminated flash sign called special attention to the display.

General Electric Co., Schenectady, N. Y., showed several types of the G.E. steam and water flow meters. These included a G.E. indicating, recording and integrating meter, two G.E. indicating meters and various nozzle plugs, pipe reducers, etc. A stereomotograph was used to show lantern slides of some fifty characteristic installations. The company was represented by R. E. Woolley, of Schenectady.

National Air Cell Covering Co., Brooklyn, N. Y., was one of the prominent exhibitors of insulating materials. Samples of the Pyro-Bestos underground covering were on display, showing the pipe guides and broken joint construction. The company was represented, as in previous conventions, by G. Clarence Hall, of the home office.

American Steam Gauge & Valve Mfg. Co., Boston, Mass., exhibited the American recording gauge, the improved Howard blow-off valve and the American Ideal steam trap. The company's booth was in the main corridor and was the rendezvous of an interested throng. Representatives of the company present were C. A. Allen, manager of the New York branch; P. H. Ryan, William Wagner; also J. E. Swendeman, of the Boston office.

Illinois Engineering Co., Chicago, Ill., had a display of its graduated supply valves, thermo return valves, vapor, atmospheric and vacuum heating specialties; as well as pressure reducing valves and back pressure valves. J. C. Matchett, of Chicago, was in charge of the exhibit, and Louis Helmer, the company's eastern manager, was also on hand.

E. B. Badger & Sons Co., Boston, Mass., exhibited different types of the Badger corrugated copper expansion joints, with patented equalizing rings. The fact that 1,000 expansion joints of this type of fitting are now being installed in the new underground steam conduits of the New York Steam Company added special interest to the exhibit.

Chapman Valve Mfg. Co., Indian Orchard, Mass., had an impressive display of its extra heavy iron body, bronze mounted gate valves, with double-seated self-packing tops for underground steam service, as used by the New York Steam Company; also standard inside screw and extra heavy outside screw and yoke bronze gate valves. The company's representatives in charge were R. C. Mitchell and Charles F. Webber.

Tyler Underground Heating Systems, Pittsburgh, Pa., showed its new condensation meters; also its underground ditch construction, single and multiple; tunnel construction, ditch and tunnel pipe casing, expansion joints and anchors. E. B. Tyler was in charge of the company's interests.

American District Steam Co., North Tonawanda, N. Y., had its usual full display of the company's method of underground construction, including models of all the various special devices which constitute its standard equipment. There was also a working model of the Simplex condensation meter, showing the manner in which steam service is sold to buildings for heating purposes. Another interesting feature was an illuminated screen demonstrating the operation of a radiator in connection with the Atmospheric system of steam heating, with the steam supply to the radiator controlled by an Adsco graduated radiator valve. The company's representatives in attendance were W. H. Wells, president; C. R. Bishop, secretary; Robert Hall, treasurer; H. C. Kimbrough, J. A. Bendure, W. J. Kline and R. C. Holley.

Plant Engineering & Equipment Co., New York, showed samples of the Lind

strom Corliss valve steam trap of the constant flow type and also the Penco thermo gauge, a new device used to prevent trap leakage. The temperature of the thermo gauge tells at once where or not the trap valve is tight. The company's headquarters are at 6 Church St., New York.

Tillotson Humidifier Co., Providence, R. I., had a display of Tillotson steam traps and Tillotson humidifiers. The booth was in charge of Ira D. Lambert, of the company's home office, at 78 Fountain Ave., Providence.

Central Station Steam Co., Detroit, Mich., showed its packless diaphragm type expansion joint and its continuous flow condensation meter in operation. The company's representatives were Prof. C. B. Veal and W. R. Owen.

Farnsworth Mfg. Co., Boston, Mass., successor to F. C. Farnsworth, of New York, had on exhibition types of its separating traps, pumping traps, vacuum traps, condensation traps and Farnsworth duplex boiler feeders. F. C. Farnsworth and J. F. Nelson, of the New York office, had charge of the company's interests.

Gilmore Mason, 615 West 162d St., New York, had a new device on view in the shape of the Mason meter, designed to measure condensation. The meter is of the dump bucket type but is remarkable for its simplicity, being the result of Mr. Mason's extensive experience as meter inspector for the New York Steam Company. Plans are going forward to market the meter on a large scale.

Michigan Pipe Co., Bay City, Mich., showed life-sized models of its tin-lined underground wood pipe covering, with shells of various sizes.

Consolidated Engineering Co., Chicago, Ill., as usual, had an elaborate display, similar to its exhibit at the convention in Chicago last year. An electrically-operated fractical valve was connected to a glass radiator, and a colored shade showed the method of controlling the steam supply to the radiator. Another device shown in operation was an electric-driven boiler feed pump. This was in addition to the line of Van Auken vacuum heating and Thermograde modulation heating specialties. F. K. Davis, of the New York office, had charge of the exhibit.

Republic Flow Meters Co., Chicago, Ill., showed a working model of the Republic flow meter, designed to measure the amount of fluid passing through a pipe to which the instrument is attached. The measurement is accomplished by means of a small electric current which is regulated by the flow of the fluid and recorded on electrical instruments mounted on a panel at any distance from the pipe. In this case the connection was made to the steam service in the laundry of the Hotel Martinique and the readings were shown on the meter in the company's booth. James D. Cunningham, president of the company, was in charge.

Bailey Meter Co., Boston, Mass., displayed types of the new Bailey fluid meter which records and integrates the flow of steam, water and air at any pressure, temperature and capacity. The use of this meter in the Harvard University buildings, which was described in a paper read at the convention, lent special interest to this exhibit. E. G. Bailey, inventor of the meter and president of the company, was kept busy explaining the new device to those interested.

Central Station Heating Notes.

Rainer Heat & Power Co., Seattle, Wash., operated during 1915 with a net income of $5,416, its gross income being $7,213, and taxes paid out totaling $1,797, according to its annual report filed with the public service commission. The company's gross revenue was $32,106, and its operating expenses, $24,892.

Davenport, Ia.—The People's Light Co. has asked for a renewal of its heat franchise which expires in 1921. The extension was asked at this time so that the company can go about making extensive improvements in its system.

Indianapolis, Ind.—How the city may eventually become smokeless is indicated by the changes that have been effected at the flour mill plant of the Acme-Evans Company. Formerly the mill was operated by the company's own power plant, but with the introduction of electrically-driven machinery and steam supply by the Merchants Heat & Light Company, the power plant at the mill has been shut down and the smoke stacks wrecked.

Rock Rapids, Ia.—At a recent city election $15,000 was voted for a municipal heating plant, to be operated in connection with the lighting system.

Pottsville, Pa.—It is announced that the Eastern Pennsylvania Light, Heat & Power Co. will spend between $250,000 and $500,000 this summer in improvements to its lines.

New Ulm, Minn.—Property owners on Minnesota Street, between Center and

Second Street, will have their buildings heated from a central station, if the plans of the Commercial Club of that city are carried out. The club appointed a special committee, composed of H. N. Somsen, Alf. J. Vogel and Ferd. Crone to look into the matter. A practically unanimous sentiment was found on the part of the property owners in favor of the plan. General consent was also given to the plan to secure easements to run the steam distributing pipes through the front of the basements of the buildings, this arrangement being found less expensive than to run them in the alley in the rear of business houses. The initial cost of the plant, according to an estimate of the Chas. L. Pillsburg Engineering Co., of Minneapolis, will be $20,000.

Sibley, Ia.—As a result of a meeting held recently at the Commercial Club, the project for a municipal heating plant for Sibley has received new impetus. It was the sense of the meeting that the plan as proposed, to use the exhaust steam from the lighting plant, was quite feasible and that a corporation be formed to take up the proposition, inasmuch as the town itself was not in a position to act at this time. It was understood that when the plant had paid for itself and had given the investors a certain amount of interest on their capital, it was to revert to the city. Three committees were appointed, one to consult with the Council regarding a franchise, another to solicit users of heat to co-operate in the undertaking and the third to look after the financing of the project. The entire cost is figured at $16,000, and it is planned to have the corporation handle one-half in cash, with a mortgage to cover the balance. This is rated at practically $10 a foot, the idea being to have about 1,500 ft., running from the light plant north to Ninth Street, then west to the business houses.

Helena, Mont.—A franchise for the installation of a central heating plant in Helena has been granted to the Gerharz-Jacqueth Engineering Company, a favorable vote having been taken on the project at a special election. The franchise requires that the heating company invest at least $25,000 within two years. At first it will serve only the business district, but it is expected later that the system will be extended to cover the residential section as well. Work, it announced, will be started at once.

Spokane, Wash.—A 25-year steam heating and electric light franchise has been granted by the City Council of Spokane to Fred. B. Grinnell. Rate regulation by the city is provided, also control of meters and character of the service. Construction work must begin within one year; ten blocks must be laid within two years, and $100,000 invested within three years. For the first five years, Spokane will receive a franchise tax of $2,000 per annum, and thereafter $2,500 per annum, but at no time shall the franchise tax be less than 1% of the company's gross earnings.

Martin & De Remer, New York, who recently opened engineering offices at 100 Broadway, specializing as engineers and managers of public utilities, industrial plants and district heating systems, announce that George J. Henry, hydraulic and mechanical engineer, of San Francisco, Cal., with offices in the Rialto Building, is associated with them.

Underground Specialties Co., New York, which, as announced last month, has been formed by Charles H. Staten, will make a specialty of steam and electric conduit protection and insulation, as well as central heating and lighting plant equipment. Mr. Staten, who is at the head of the new company, has been connected with this branch for the past 18 years. He has also made a study of sewage disposal and water purification and is prepared to design and install systems of this nature. The company's offices are at 1476 Broadway.

H. R. Wetherell, of Peoria, Ill., who has been appointed steam expert for Hopendyl, Hardy & Co., New York, will not make his headquarters in New York, as announced, but, for the present, will be located in Peoria.

Arthur D. Little, Inc., Boston, Mass., announces that a Dominion charter has been granted in Canada to Arthur D. Little, Ltd., a corporation organized and equipped for the service of Canadian industry and the study and development of Canadian resources. The new company has opened offices in Montreal, Canada, at 137 Gill Street. The special facilities of the new corporation will be supplemented by the entire staff organization and equipment of the Boston firm.

"Sheet Metal" Purchased by E. A. Scott. Edwin A. Scott, formerly secretary of the American Society of Heating and Ventilating Engineers, has purchased Sheet Metal, published monthly in New York. The June issue is the first to appear under Mr. Scott's direction. The publication is devoted to the furnace and sheet metal industries. Mr. Scott will have the good wishes of his many friends in the trade in his new work.

LEGAL DECISIONS

Tax on Central Steam Heating Companies.

Under the Pennsylvania act of May 23, 1889, as amended by the act of May 16, 1901, giving to cities of the third class the right "to levy and collect a license tax not exceeding $100 each annually on all contractors * * * steam heating, gas, water, light and power companies," it is held that a city of the third class has the right for general revenue purposes to enact by ordinance that "all gas companies or individuals furnishing light or heat thereby shall pay annually a license tax of $100."—Altoona City vs. O'Leary, 60 Pennsylvania Superior Court, 159.

Defective Steam Heating Plant—Waiver by Tenant.

A tenant rented a house at a summer resort for one year from July 1, by a lease which provided that he was to take the premises as he found them and was not to call on the lessor for any repairs, and that $100 was to be deducted from the last payment of rent, to be applied to alterations, repairs, etc. He took possession and paid the first quarterly installment of rent September 1, after having made an inspection of the heating plant. On September 25 he wrote inquiring about an option for a year's extension of the lease. After occupying the house four months, he resisted payment of the second installment of rent, due November 1, on the ground of misrepresentations of the lessor as to the condition of the heating plant. The New York Appellate Division, Stokes vs. Avila, holds that he could not escape payment on such a ground, any such misrepresentations being waived by his conduct and delay. His inspection of the premises in August had revealed the non-existence of floor radiators and the absence of connecting pipes and an estimate obtained for the necessary repairs, after which he paid the first term's rent.

Where Heating Plant Is Not a Trade Fixture.

The city of New York condemned premises occupied as a hotel and saloon and contracted with a wrecker to remove the buildings. A steam heating plant which had been placed in the premises by the tenant's father, who had formerly conducted the business, was sold by the tenant, along with the other contents of the building. The wrecker brought an action for the conversion of the heating plant. The New York Appellate Division, Levenson Wrecking Co. vs. Hillebrand, 157 N. Y. Supp., 515, holds that the heating plant in a building used as a hotel saloon is not a trade fixture, and the action would lie, as the plaintiff had an existing right to the immediate actual possession of the plant at the time of the conversion.

The Warm-Air Furnace Publicity Campaign.

A publicity campaign that will cost, it is understood, close to $25,000, has been inaugurated by the National Warm Air Heating and Ventilating Association in an effort to increase the popularity of warm-air furnace heating. The appeal is being made to the general public through such mediums as The Saturday Evening Post.

Inquirers are urged to send for the association's "Book on Heating and Ventilation," and all replies received at the association headquarters in Columbus, O., are transmitted to the members.

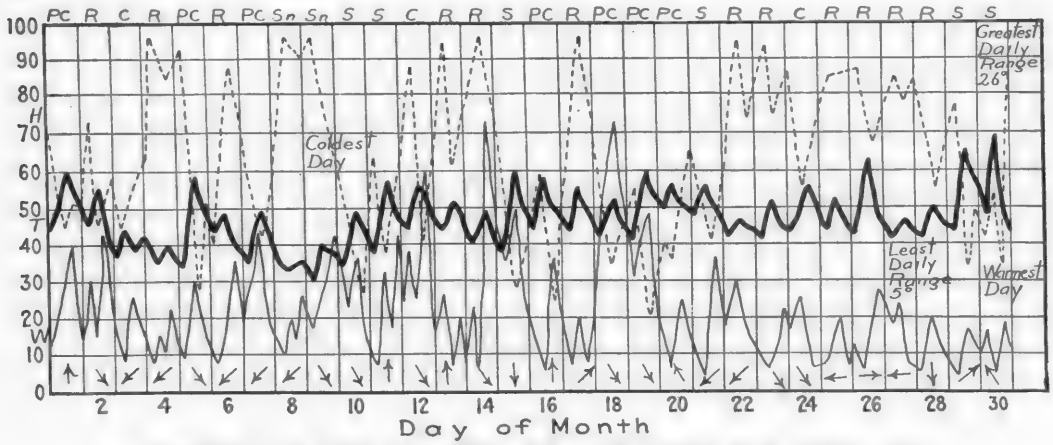
The accompanying trade-mark, which has been adopted by the association, is used extensively in its advertising. As will be seen, this sort of publicity not only calls attention to the campaign of the furnace manufacturers, but is also one of the most important propagandas that have been started to awaken the public on the general subject of good ventilation.

EMBLEM OF THE NATIONAL WARM AIR HEATING AND VENTILATING ASSOCIATION.

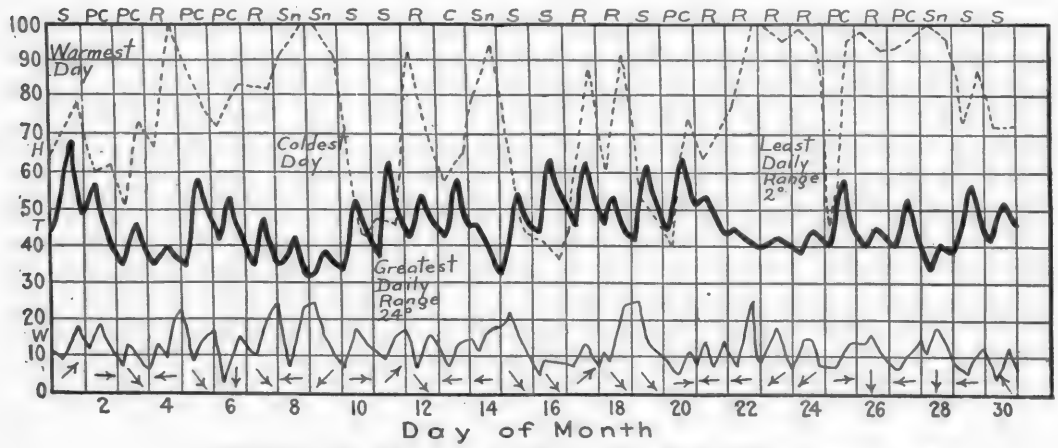
A notable feature of the advertising is that the association offers free engineering in connection with the design of any installation, the advertisments reading "if you would have a heating plan drawn to fit your home, write us and we will see that it is supplied you without cost."

The Weather for April, 1916.

	New York.	Boston.	Pittsburgh.	Chicago.	St. Louis.
Highest temperature, degrees F.....	69	68	82	77	85
Date of highest temperature.....	30	1	20	12	12
Lowest temperature, degrees F.....	30	32	28	26	30
Date of lowest temperature.....	9	8	7	6	6
Greatest daily range, degrees F.....	26	24	29	34	32
Date of greatest daily range.....	30	11	20	12	11
Least daily range, degrees F.....	5	2	5	3	6
Date of least daily range.....	27	23	3	26	2
Normal temperature for month, degrees F.	47.1	46	49	48.1	54.4
Normal mean temp. for month, degrees F.	48.1	45.3	51	45.9	56.1
Total rainfall, inches.....	3.28	4.51	2.54	1.6	1.78
Total snowfall, inches.....	3.3	4.2	5.7	None	Trace
Normal precipitation, this month, inches...	3.3	3.55	2.9	2.88	3.52
Total wind movement, miles.....	12,471	8,221	8,466	9,854	10,508
Average hourly wind velocity, miles.....	17.3	10	11.8	13.7	14.6
Prevailing direction of wind.....	N.W.	N.W.	N.W.	W.	N.W.
Number of clear days.....	6	9	2	8	8
Number of partly cloudy days.....	9	7	6	8	9
Number of cloudy days.....	15	14	22	14	13
Number of days on which rain fell.....	17	14	16	13	13
Number of days on which snow fell.....	2	4	2	None	1
Snow on ground at end of month, inches..	...	...	...	...	...


Pc R C R Pc R Pc Sn Sn S S C R R S Pc R Pc Pc Pc S R R C R R R R S S
Greatest Daily Range 26°
Coldest Day
Least Daily Range 5°
Warmest Day
H
T
W
100 90 80 70 60 50 40 30 20 10 0
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
Day of Month

RECORD OF THE WEATHER IN NEW YORK FOR APRIL, 1916.
(Hourly Observations of the Relative Humidity are Plotted on This Chart.)


S Pc Pc R Pc Pc R Sn Sn S S R C Sn S S R R S Pc R R R R Pc R Pc Sn S S
Warmest Day
Coldest Day
Least Daily Range 2°
Greatest Daily Range 24°
H
T
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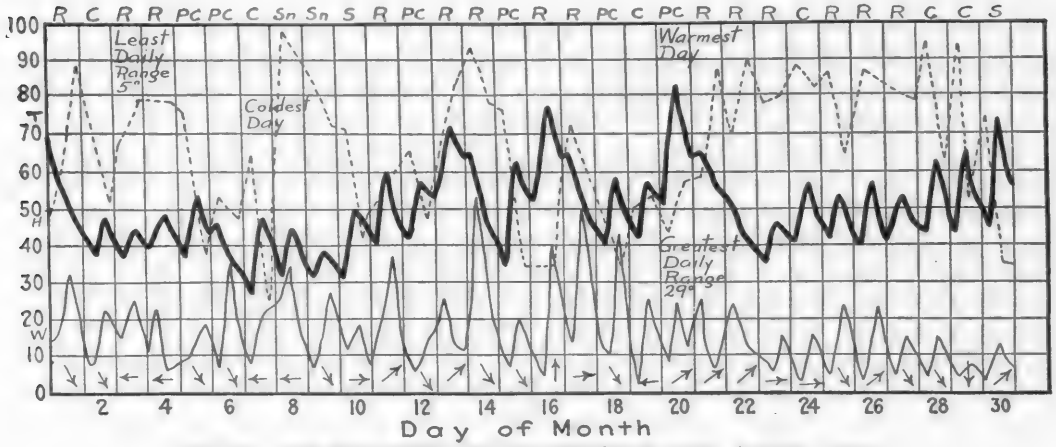
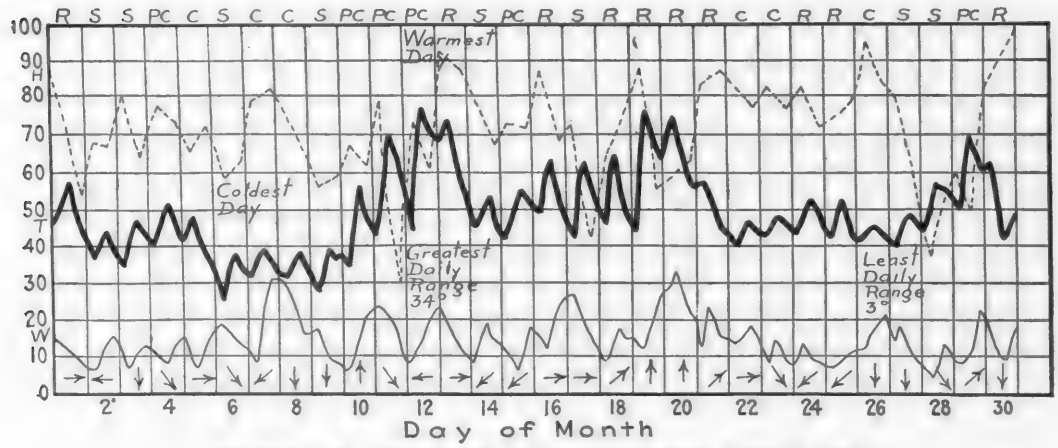
100 90 80 70 60 50 40 30 20 10 0
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
Day of Month

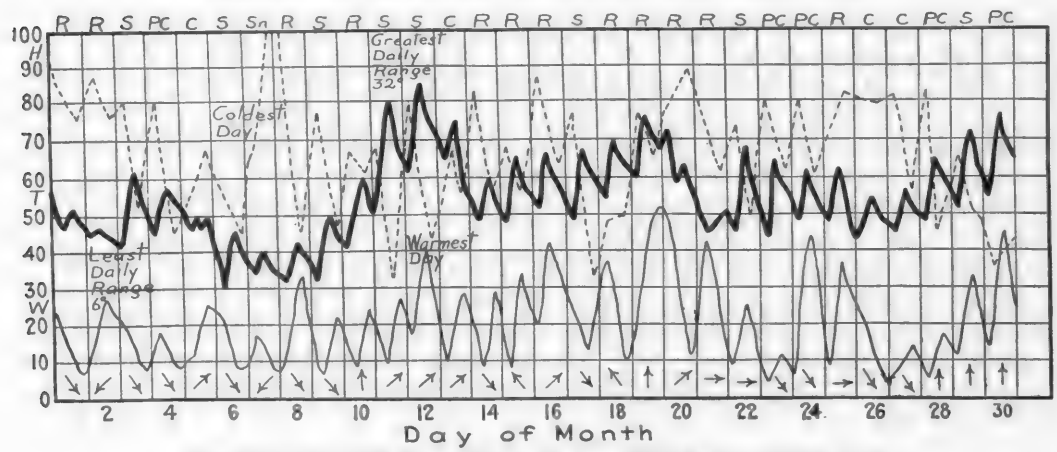
RECORD OF WEATHER IN BOSTON FOR APRIL, 1916.



RECORD OF WEATHER IN PITTSBURGH FOR APRIL, 1916.



RECORD OF WEATHER IN CHICAGO FOR APRIL, 1916.



RECORD OF THE WEATHER IN ST. LOUIS FOR APRIL, 1916.

Plotted from records especially compiled for THE HEATING AND VENTILATING MAGAZINE, by the United States Weather Bureau.

Heavy lines indicate temperature in degrees F.

Light lines indicate wind in miles per hour.

Broken lines indicate relative humidity in percentage from readings taken at 8 A. M. and 8 P. M.

S—clear, P C—partly cloudy, C—cloudy, R—rain, Sn—snow.

Arrows fly with prevailing direction of wind.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

Plans for Summer Meeting.

On his return from a trip to Detroit and Chicago on society matters, Secretary C. W. Obert announced that the headquarters for the society's mid-summer meeting, to be held in Detroit, Mich., July 19-21, will be at the Hotel Statler. The sessions on the opening day, Wednesday, will be held at the hotel. The next day, Thursday, the delegates will be taken by the Michigan Chapter to Ann Arbor, with a professional session at the University of Michigan, and an inspection of the testing laboratory of Prof. John R. Allen. Prof. Allen is conducting some new and interesting tests which he will describe to the delegates. The Friday session will be held in Detroit.

Annual Dinner of New York Chapter.

The successful get-together meetings of the New York Chapter, which have been a feature of the past season, were brought to a fitting close May 22, when the chapter held its annual dinner at the clubrooms of the Building Trades Employers' Association, on West 33d Street. Following the practice at other recent chapter meetings, a special committee had been appointed to take charge of the meeting, and it was stated that the success of this arrangement will no doubt lead to its adoption another year, the new president, Arthur Ritter being credited as the originator of the plan. By dividing the membership into a given number of groups it will give the opportunity to every member of the chapter to serve at some time during the year on a meeting committee.

At the conclusion of the dinner, which was supplemented with cabaret features, President W. H. Driscoll announced that the chairman of the May meeting committee, A. S. Armagnac, would act as toastmaster. Mr. Armagnac said that the development of a more friendly spirit in the chapter was the principal feature of the past year's activities and that the plan on which the chapter was being operated would no doubt tend to increase goodfellowship among the members. There is much talk about co-operation, he said, in engineering matters, as well as efforts to improve engineering ethics and professional fees, but these projects will not get very far until the members get to have a genuine interest in each other's welfare and get to know each other better.

He then introduced Prof. Charles E. Lucke, of Columbia University, who delivered a thoughtful address on the "High-Speed Internal Combustion Engines, With Special Reference to Aeroplane, Automobile and Speed Boat Requirements." Prof. Lucke talked with the aid of blackboard illustrations and held the attention of the diners for over an hour with a discussion that was commented upon as a masterful presentation of the subject. He brought the matter home to the members by stating that the time is coming when high-speed units, located at the application of the power, will supplant the present practice of generating the power at a central point and distributing it in different directions. He characterized the internal combustion engine as a complete power plant in itself and urged every engineer to watch more closely the developments in this field. Prof. Lucke was heartily applauded at the conclusion of his address and the diners gave him a rising vote of thanks.

Closing Meeting of Illinois Chapter.

C. W. Obert, secretary of the American Society of Heating and Ventilating Engineers, was a guest at the May meeting of the Illinois Chapter at the Hotel Morrison, which brought the season's program to a close. During the usual chapter dinner, a cabaret performance was given under the direction of Ray Stackhouse. In the absence of President E. L. Hogan, Vice-President W. F. Powers acted as toastmaster. Secretary Obert, who was the first speaker, told of some of the plans for the coming summer meeting of the society, July 19-21, in Detroit.

President Harry M. Hart, of the heating engineers' society, also spoke, urging that those present, not already members of the chapter, apply for membership.

Annual Meeting of Massachusetts Chapter.

The annual meeting of the Massachusetts Chapter in Boston, May 9, took the form of a noonday luncheon. The committee reports, as well as the treasurer's report, showed a successful year of effort, with a substantial balance in the treasury. New officers were elected as follows: President, Fred S. Boltz; vice-president, W. W. Underhill; secretary, Charles Morrison; treasurer, William T. Smallman; board of governors: William G. Snow, Frank Irving Cooper and Eugene R. Stone.

The chapter meetings will be resumed, after the summer months, the first Tuesday in October.

Michigan Chapter Hears Address on Car Heating.

Elmer W. Reitz, chief engineer of the Chicago Heating Company, was the principal speaker at the May meeting of the Michigan Chapter, which was held in Detroit, May 9. Mr. Reitz's subject was "Heating Cars in the Future," and he told of the methods that are being developed whereby the temperature in Pullman berths may be regulated by a turn of the wrist.

Prof. John R. Allen, president of the chapter, recently met with the loss of an eye through an accident in which his eyeball was pierced by a small stick on which he had stepped. In his absence the meeting was presided over by E. E. McNair.

Secretary C. O. Obert of the society was the chapter's guest and William F. Verner, of the University of Michigan, also spoke. It was stated that the present membership of the Michigan Chapter is 55 and that plans were going rapidly forward in connection with the society's forthcoming meeting in Detroit.

Eastern Pennsylvania Chapter.

A dinner meeting of the Eastern Pennsylvania Chapter was held May 11 at the Engineers' Club, 1317 Spruce Street. The speaker of the evening was Lee Nusbaum, who gave an interesting talk on "Refrigeration."

NATIONAL ASSOCIATION OF MASTER STEAM AND HOT WATER FITTERS

New York State Association.

New officers were elected as follows at the annual convention of the New York State Association of Master Steam and Hot Water Fitters, which was held in Buffalo, May 9: President, William H. McKiever, New York; vice-president, John R. Sheehan, Schenectady; secretary-treasurer, William J. Olvany, New York; board of directors: E. T. Childs, New York; Herman J. Brandeis, Utica; William J. Devendorf, Rochester; N. Loring Danforth, Buffalo, and Joseph D. Riley, Niagara Falls. The convention was opened by President N. Loring Danforth, and among the principal items up for discussion was the question of figuring overhead expense and a proposition to have manufacturers mark cast-iron fittings in a way that would indicate their source.

From data on the matter of overhead expense contained in a paper by President Danforth, it was learned that some members were figuring this item as low as 7½%, while others placed it at 22½%. The average figure, it was found, came to 16%.

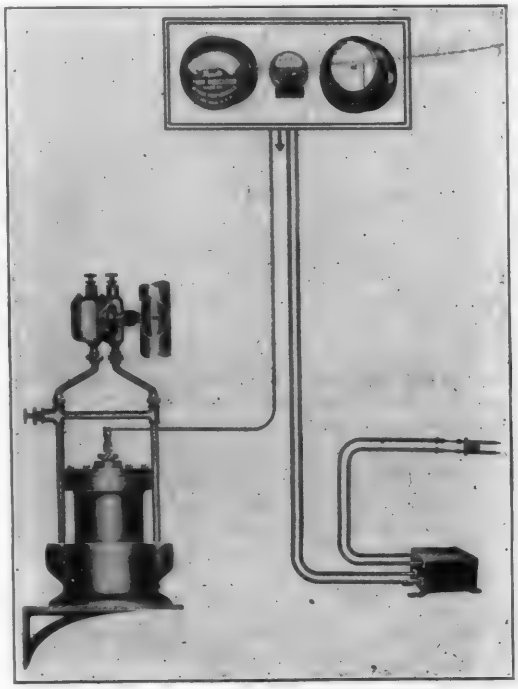
Following the convention, the Buffalo members entertained the delegates at a dinner at the Hotel Iroquois, the retiring president, Mr. Danforth, acting as toastmaster.

NEW DEVICES

A Meter That Registers Flow at a Distance.

A meter for measuring the flow of steam, water, air or gas, which can be placed at any desired distance from the pipe line, is an interesting device which has been perfected by the Republic Flow Meters Co., Chicago, Ill. The accompanying illustrations show how the connections are made for distance readings. The measurement is accomplished by means of a small electric current which is regulated by the flow of the liquid and is recorded on electrical instruments which, as stated, may be located at any distance from the pipe. In addition to measuring the current, these meters also register the amount of fluid passing through the pipe.

The installation as shown comprises a



REPUBLIC FLOW METER CONNECTED FOR DISTANCE READINGS.

regular transformer producing an initial low voltage circuit, which includes the instruments on the panel, the meter body and is completed through the ground. An averaging Pitot tube, inserted in the pipe where the flow is to be measured, transmits the pressure difference created by the flow to a mercury column in the meter body.

The rise and fall of the mercury engages and disengages suitable conductors regulating the amount of current flowing through the circuit. Accordingly, the total amount of electrical energy measured by the flow integrator is the exact equivalent of the total amount of fluid passing through the pipe, and the instantaneous flow of current shown by the indicator and recorder is equivalent to the instantaneous flow of fluid through the pipe. In this way all floats, cams, levers and gears are eliminated and there are no moving parts in the meter body.

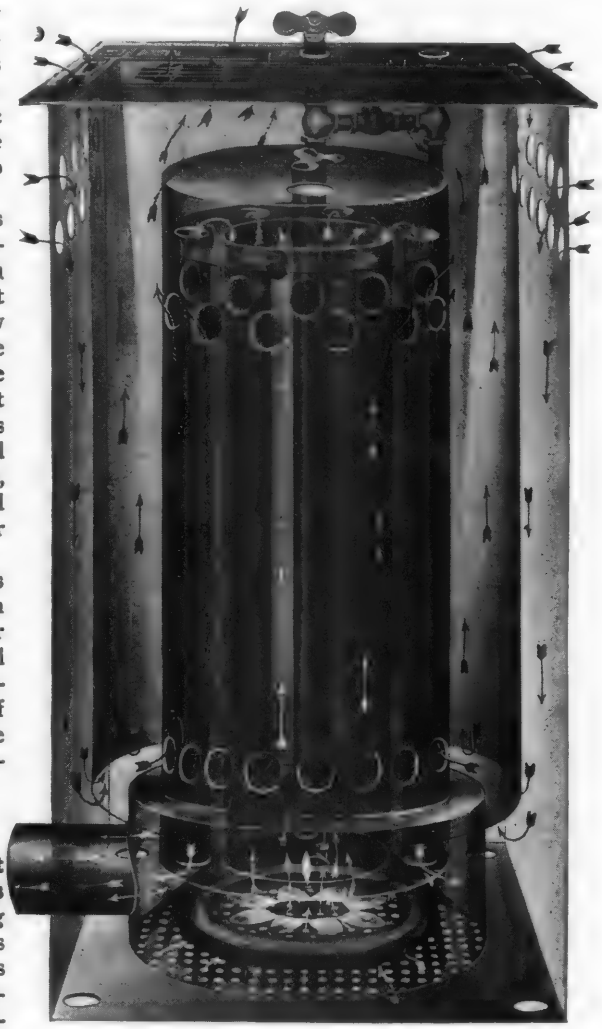
In a recent catalogue descriptive of this meter the details of construction are taken up at length, with views showing a number of diagrammatic applications, supplemented by a discussion of the fundamental principles of the Republic flow meter and of the Republic equal area Pitot tube. Size of catalogue (Bulletin 4) 8½ x 11 in. (standard). Pp. 20.

Unit Plant Hot Blast Heaters.

An apparatus which is termed a hot blast floor furnace, using gas for heating, has been brought out by the Unit Gas Heating Co., Los Angeles, Cal. It is described as the first circulating fresh air unit plant gas heating device on the market. The products of combustion are vented into a chimney or directly outdoors.

Each unit, it is claimed, will bring in a minimum of 5,000 cu. ft. of fresh warmed air each hour, these results being obtained on a consumption of 20 cu. ft. of artificial gas per hour or 10 to 12 cu. ft. of natural gas.

These units are built like the ordinary warm air furnace, but reduced in size. They are operated from the inside of the room. Each heater will warm from two to five rooms or from 3,000 to 7,000 cu. ft. of space. It has four thicknesses of metal and three air spaces of 1 in. each between fire and wood to make the heater fireproof. The burner is located about 20 in. below the floor. The heater is made in four styles, one with fresh air intake on side, for use in buildings having sufficient fresh air circulation under same, and another with intake at bottom, for use in buildings where it is desired to take air from outdoors. The other styles are built with wall registers, the



INDIVIDUAL HOT BLAST GAS FLOOR FURNANCE.

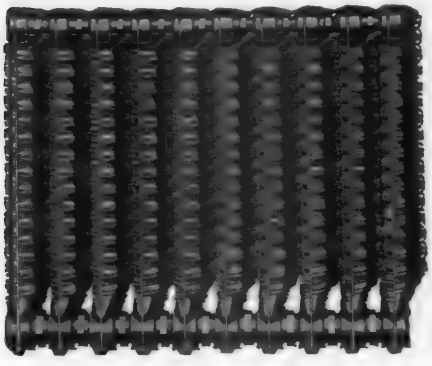
size of the wall furnace front being 17 x 19 in., with a recessed portion of 14 x 17 x 4 in. between studding. The recessed portion has a 2-in. vent opening at the top, operated by a damper in front. Both the vent and fresh air intake pipes go between the studding.

The Smith Hot-Blast Radiator.

The accompanying illustrations show the design and construction of the Smith hot-blast radiators, which have been placed on the market by the H. B. Smith Co., Westfield, Mass. These heaters have been under test by the company for some time and are now offered to the trade accompanied by performance figures covering temperatures and condensations for all sizes and with varying air velocities.

The design has been made with the idea

of having all air passing through the heater come into actual contact with either the prime surface or the slightly extended low rib surface. These ribs run horizontally around the heater.



SMITH HOT-BLAST RADIATOR.

The sections are designed so that they may be built up in tiers. Each radiator section is 9 in. wide, and they are made in 41-in., 51-in. and 61-in. heights, with spacings on centers of 5 in., 4⅝ in. and 5⅜ in. Their surfaces are, respectively, 10.75 sq. ft., 13.5 sq. ft. and 16 sq. ft.

The following table gives performance figures for a standard type, with spacing 5 in. center to center of section, based on

SECTIONAL AND PLAN VIEWS OF SMITH HEATER SECTIONS.

steam at 227° F., 5 lbs. gauge and entering air above zero.

A New Boiler Meter Based on the Design of the Bailey Flow Meter.

The accompanying illustration shows a typical installation of the Bailey boiler meter, which is built on the general lines of the Bailey flow meter, described in last month's issue. It is described as really a combination of three separate meters in one

TEMPERATURES AND CONDENSATIONS, SMITH HOT-BLAST RADIATOR. REGULAR SPACING 5-in. CENTER TO CENTER OF SECTION.

Number of Stacks in Heater	Temperature of Entering Air	Velocity through heater in feet per minute Measured at 70°																					
		100		150		200		600		800		1000		1200		1400		1600		1800		2000	
		Final Temp. of Air Leaving Heater	Cond. per sq. ft. per Hour Lbs. Stm.	F. T.	C.	F. T.	C.	F. T.	C.	F. T.	C.	F. T.	C.	F. T.	C.	F. T.	C.	F. T.	C.	F. T.	C.	F. T.	C.
1	20	90	.44	86	.50	77	.72	60	1.50	56	1.50	53	2.05	51	2.29	49	2.48	46	2.62	44	2.71	43	2.88
	30	98	.41	92	.47	83	.67	68	1.43	64	1.69	62	1.98	60	2.25	58	2.39	55	2.52	53	2.60	52	2.75
	40	103	.30	99	.45	90	.64	76	1.35	72	1.59	70	1.86	68	2.06	66	2.22	63	2.32	62	2.48	61	2.62
	60	115	.34	112	.40	104	.56	92	1.19	88	1.39	86	1.60	84	1.75	83	1.95	81	2.11	80	2.25	79	2.37
	70	121	.32	118	.37	111	.52	99	1.08	96	1.28	94	1.47	92	1.60	91	1.77	89	1.91	88	2.02	87	2.11
2	20	133	.36	128	.41	115	.61	90	1.33	84	1.62	78	1.65	74	2.05	71	2.26	68	2.42	65	2.60	64	2.75
	30	137	.34	133	.39	120	.58	96	1.25	90	1.51	85	1.75	81	1.94	78	2.12	75	2.27	73	2.43	71	2.56
	40	141	.32	137	.37	124	.54	103	1.19	97	1.44	92	1.65	89	1.81	85	1.98	83	2.15	81	2.33	79	2.43
	60	149	.28	146	.33	134	.48	115	1.04	110	1.26	105	1.42	103	1.59	100	1.76	98	1.90	96	2.01	94	2.10
	70	153	.26	150	.30	139	.44	121	.96	117	1.18	112	1.32	109	1.47	107	1.62	105	1.74	103	1.84	102	1.97
3	20	162	.30	157	.35	143	.53	113	1.18	106	1.46	100	1.70	95	1.90	91	2.11	88	2.28	85	2.44	81	2.58
	30	165	.29	160	.33	146	.50	118	1.12	111	1.37	106	1.61	101	1.80	97	1.96	94	2.14	91	2.29	87	2.40
	40	168	.27	163	.31	150	.47	124	1.07	117	1.30	112	1.53	107	1.69	103	1.84	100	2.01	97	2.14	94	2.28
	60	173	.24	169	.28	157	.42	134	.94	127	1.13	123	1.33	119	1.49	116	1.63	113	1.77	111	1.91	108	2.03
	70	175	.22	172	.26	160	.39	139	.88	133	1.07	129	1.25	123	1.39	122	1.51	119	1.63	117	1.75	114	1.86
4	20							134	1.09	140	1.35	118	1.57	113	1.77	108	1.96	104	2.13	100	2.28	97	2.43
	30							138	1.03	144	1.27	123	1.49	118	1.67	113	1.85	109	2.00	105	2.14	102	2.27
	40							142	.97	148	1.19	127	1.40	122	1.56	118	1.73	114	1.87	111	2.02	108	2.14
	60							150	.86	155	1.05	137	1.24	132	1.37	128	1.51	125	1.64	122	1.76	120	1.89
	70							154	.80	159	.99	141	1.14	137	1.27	134	1.42	131	1.54	128	1.65	126	1.76
5	20							149	.98	140	1.23	134	1.41	127	1.64	123	1.81	117	1.99	113	2.12	110	2.26
	30							153	.94	143	1.17	138	1.36	132	1.55	127	1.71	122	1.88	118	2.00	115	2.13
	40							156	.88	147	1.10	142	1.29	136	1.46	131	1.60	127	1.77	123	1.89	120	2.01
	60							163	.78	154	.97	149	1.12	144	1.27	140	1.40	137	1.56	133	1.66	130	1.75
	70							166	.74	158	.90	153	1.04	148	1.18	145	1.31	142	1.45	138	1.54	135	1.62
6	20							161	.90	152	1.13	146	1.34	140	1.53	134	1.69	130	1.86	126	2.01	122	2.14
	30							164	.86	155	1.07	149	1.27	143	1.44	138	1.60	134	1.76	130	1.90	126	2.02
	40							167	.81	158	1.00	152	1.19	147	1.27	142	1.51	138	1.65	135	1.80	131	1.91
	60							172	.72	164	.88	159	1.06	154	1.19	150	1.33	146	1.45	143	1.57	140	1.67
	70																						
7	20							172	.84	164	1.05	157	1.25	151	1.43	144	1.59	140	1.74	136	1.90	132	2.03
	30							174	.79	166	.99	158	1.19	154	1.35	147	1.50	143	1.64	139	1.78	136	1.92
	40							175	.75	169	.94	161	1.12	156	1.28	151	1.43	147	1.55	143	1.68	140	1.81
	60																						
	70																						
8	20							180	.77	172	.97	166	1.16	160	1.34	155	1.50	150	1.64	145	1.78	141	1.91
	30							182	.73	174	.92	168	1.10	163	1.27	158	1.42	153	1.55	148	1.68	144	1.80
	40							184	.69	176	.87	170	1.02	165	1.19	160	1.33	156	1.46	151	1.58	147	1.69
	60																						
	70																						

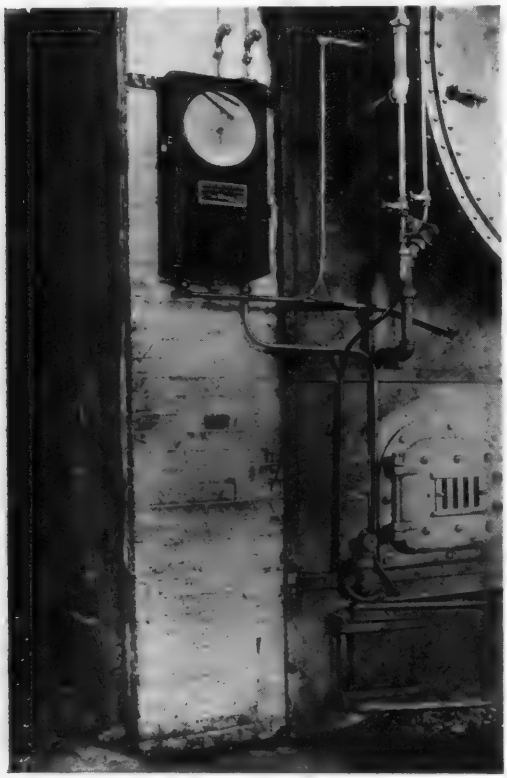
*Unless otherwise specified Radiators will be shipped with R. & L. Nipples for regular spacing (5" Centers)

Steam 227° F. 5 lbs. Entering Air Above Zero.

casing, each drawing its own record in a distinctive color on a 12-inch chart. The meter records (1) the rate of steam output from the boiler; (2) the rate of air flow through the furnace; and (3) the condition of the fuel bed. The meter also correlates and compares these factors in a way that is easily understood by the fireman at the same time giving him information for making any necessary changes in the furnace or draft conditions.

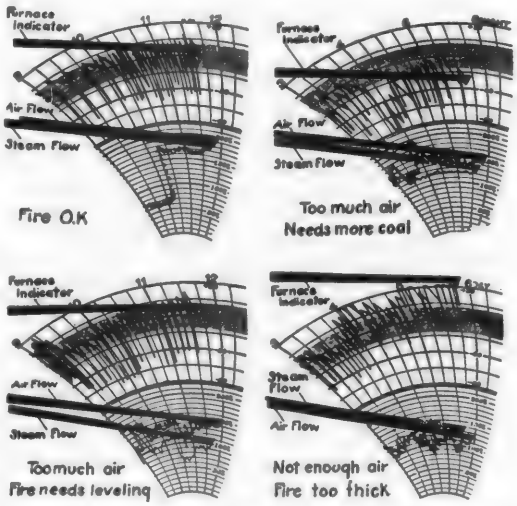
The steam flow is recorded by a red pen drawing a red record in the center section of the chart, the graduations being in per cent. of the boiler's rated capacity on a uniform scale. This part of the meter is identical with the Bailey steam meter. It operates upon the principle of measuring the pressure difference across a Monel metal orifice placed in a flange of the steam line.

The air flow is recorded by the blue pen traveling just ahead of the steam flow pen. This pen is operated by the draft differential between the firebox and the uptake, but instead of reading in terms of draft, it reads in terms of steam output. Thus it draws a coincident record with the steam flow so long as the right amount of air is used for combustion.



BAILEY BOILER METER INSTALLED.

The furnace indicator drawing a record on the outer section of the chart shows the conditions of the fuel bed. The fire is of



HOW TO READ THE BAILEY FLOW METER.

the right thickness when this pen is on the shaded band. It is operated by draft pressures and is really a measure of the resistance of the fuel bed to the flow of air. This meter is made by the Bailey Meter Co., Boston, Mass.

The New Mason Condensation Meter.

A meter adapted for measuring liquids and condensed steam and described as an improvement fulfilling the needs of reliable record, simple construction and reduction in cost of operation, has been brought out by Gilmore Mason, superintendent of the uptown system for the New York Steam Co., 105 East 63d Street, New York. It was on view for the first time at the recent convention of the National District Heating Association, in New York.

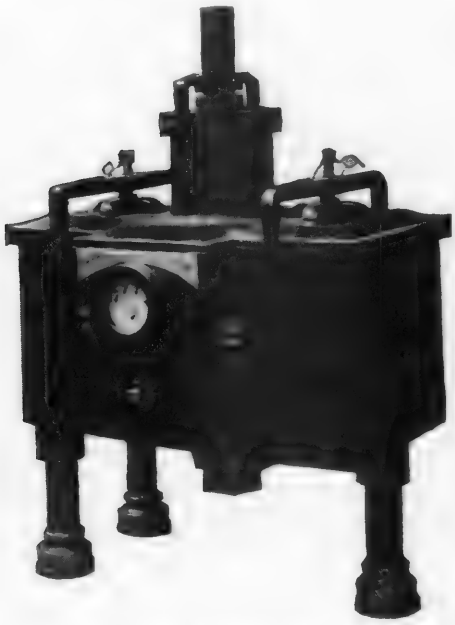
Mr. Mason has had many years' experience in connection with meter testing and experiments and his new device is a direct result of this experience, his purpose being to perfect a design that requires the minimum in meter maintenance.

Five features of the Mason meter contribute to this end: (1) the inlet tank, consisting of water and sediment deflector; (2) outside access to adjusting screws; (3) simple operation of locating the original adjustment points, made possible by the use of an adjusting key which is connected to the bucket shaft by inserting the key

through the opening immediately under the counter housing; (4) the arrangement of the water deflectors on the inner side of the bottom of the meter casing which causes a splash of water over the bearings during each discharge of the dumping buckets; (5) the three bosses projecting from the bottom of the casing and tapped for 1¼-in. nipples, affording the major portion of a shelf or stand to support the meter body. The purpose of the three legs is to make the setting of the meter similar to a tripod.

The original calibration and adjustment points are established at the shop or testing room, which is the only occasion necessary requiring the use of water for testing. The adjustment positions are located on the gauge or plate, found immediately over the counter housing. They are spaced 1-16-in. apart, indicating variations of 2 per cent. point to point. When the key is inserted for adjustment reading, such readings are made from the end of the plate toward the center. A record of the number of points for each side is made, indicating the original or correct adjustment. The serial number of the meter is noted at the same time.

The meter is intended to remain in place



THE MASON METER.

permanently after it is installed for service. At the end of the season the inspector uses the adjusting key for testing and, if the adjusting gauge shows correction in adjustment necessary, the caps over the adjusting screws are removed for the purpose of manipulating the screws to restore the original adjustment. This covers a period of time of about 5 min. and is all done from the outside of the meter casing.

The inspector should next examine the sediment tank, indicated above as the inlet tank. The nut supporting the clamp on the inlet neck is released and, if the meter

CONSTRUCTION OF MASON METER.

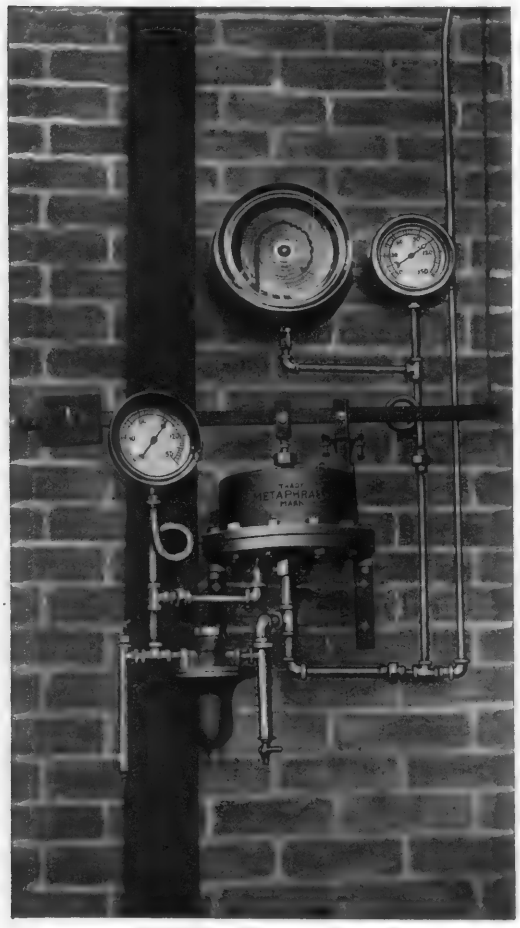
is properly connected, the inlet cover can be raised to allow removal of the sediment tank for cleaning. The maximum time, it is stated, for this operation, should not be over 5 min.

It is pointed out that the methods above described are all that are necessary for the season's overhauling. This eliminates such features as cleaning meter parts, or body. This saving is due to the fact that at each discharge of the dumping bucket the inside body of the meter is washed and, with the assistance of the water-lubricating deflectors located at the bottom, a splash of water is carried over the bearings, keeping them automatically and constantly lubricated. In this way the use of oils or grease is avoided.

The meter, in short, is described as a product that comprises a four-in-one combination, consisting of (1) a complete liquid meter, (2) a sediment trap, with its own accompaniments, (3) an automatic lubricating device and (4) the major portion of a supporting shelf.

Trade Literature.

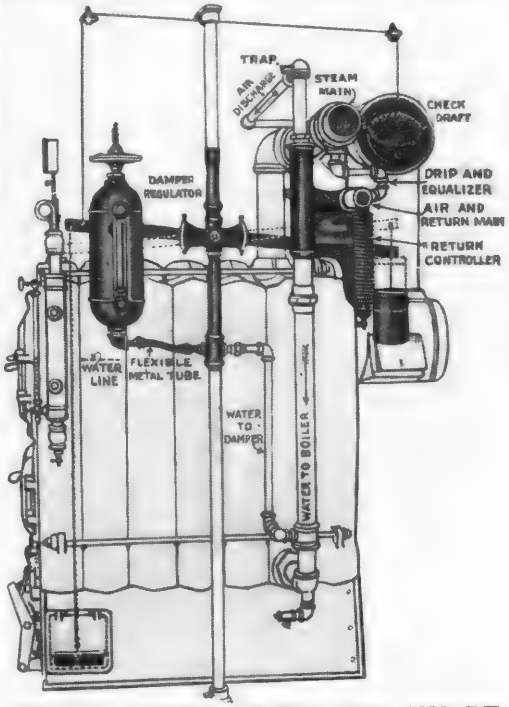
METAPHRAM HIGH PRESSURE STEAM DAMPER REGULATORS, described as a new departure in high pressure fields, are illustrated and described in newly-issued circular matter issued by the National Regulator Co.,



TYPICAL INSTALLATION OF METAPHRAM HIGH PRESSURE STEAM DAMPER REGULATOR.

Chicago, Ill. They are described as simple, sensitive and direct-acting, automatically operating a balanced draft damper on a slight variation of steam pressure. This device is designed for boiler pressures from 15 to 175 lbs. It requires no auxiliary power and has no packings, perishable or wearing parts. As may be noted from the illustration, it can be installed like any low pressure regulator or on brackets at any convenient point. Boiler pressure is admitted direct to the inside of the diaphragm and the outside of the diaphragm through a strainer and reducing valve. If the pressure to be carried is, say, 100 lbs., the reducing valve is set to close at the same pressure. Therefore, when the boiler pressure increases, it builds up on the inside of the diaphragm, thus gradually inflating it and actuating the lever controlling the damper. Condensation is discharged by means of a small trap and drip pipe run to the ash pit. The point is emphasized that this damper regulator is absolutely graduated in its action. It is provided with adjustable fulcrum and sliding lever.

TURNER DAMPER REGULATOR AND CONTROLLER, to be attached to a steam boiler and designed to positively control the chimney check draft and thus maintain any uniform pressure desired in the boiler, is a unique attachment described in a new circular issued by the Turner Heating Co., 143 Eddy Street, Providence, R. I. This device can be connected to an apparatus already installed, as well as to a new apparatus. It is so constructed that vapor or pressure forces water from the boiler into the receiver. The weight of the water

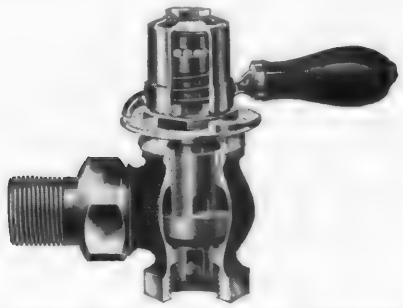


TURNER DAMPER REGULATOR AND RETURN CONTROLLER.

closes the dampers and as the pressure goes down, the water flows back into the boiler when the dampers will open. The amount of vapor or pressure is determined by the height of the receiver above the water line in the boiler. It is stated that the return controller can be used on one-pipe loop

systems to eliminate air and fill the entire loop main with steam, making the remote radiators heat quickly. In vapor heating, condensation and air are separated in the controller, the condensation returning to the boiler and the air to the chimney, through a trap, as shown in the accompanying illustration. In severe weather the return controller makes it possible to increase the efficiency of a vapor installation by raising and using steam pressure. Full directions for installing are included in the circular.

DOLE GRADUATED OR MODULATING VALVE, described as the ideal valve for vacuum or vapor steam heating, is brought to the attention of the trade in new circular matter received from the Dole Valve Co., 208 North Fifth Avenue, Chicago, Ill. This valve, which is 4⅜ in. high, is packless and ball-bearing. It is designed as a marked improvement over other styles of modulating valves and has been the object of several years of experimenting by the company. The graduated sections are made in various sizes to meet all requirements of radiation. In case of a desired adjustment after the valve is fitted and installed, it is only necessary to loosen the octagon nut on top of the dial with a special wrench furnished for the purpose, turn the dial to the left to the desired point and then tighten the nut. In this way it is possible to have with this valve every degree of opening required in vacuum or vapor steam heating. This adjustment may be made without interfering with any of the working parts of the valve and while the steam is on. The company states that over a quarter of a million Dole valves are in use and in not one has the packless disc been changed.



NEW TYPE OF DOLE GRADUATED OR MODULATING VALVE.

CONNERSVILLE VACUUM CLEANERS are the subject of a new catalogue published by the Connersville Blower Co., Connersville, Ind., in which this company has sought to give "Connersville" purchasers the advantages of the company's nine years of experience in this field. The company states that for ordinary conditions one of its standard units can be selected to give any cleaning results desired. For special conditions the company maintains a staff of engineers who are prepared to work out an equipment to carefully meet any given specifications. The necessary data are included in the catalogue and this is followed by a number of representative Connersville installations, some of them being accompanied by testimonials showing the satisfactory service given by this equipment.

INGERSOLL-ROGLER VACUUM PUMPS, which it is stated, are rapidly superseding direct-acting pumps for high efficiency and economy, are attractively presented in a new circular issued by the Ingersoll-Rand Co., 11 Broadway, New York. It is also stated that they embody features heretofore unattainable in vacuum pumps, such as high vacuum, the economical maintenance of any desired degree and the handling of discharge pressures of several pounds. They are equipped with the "Ingersoll-Rogler" inlet and discharge valves which permit of high rotative speeds. These valves are multiported, giving large valve areas, are automatic in action, have a low lift for a given port opening and require little power to operate. Flash ports in the cylinder walls are included to prevent the building up of pressure to prematurely open the valves, thus making possible a high volumetric efficiency. Attention is also called to the comparatively small floor space required by this type of compressor.

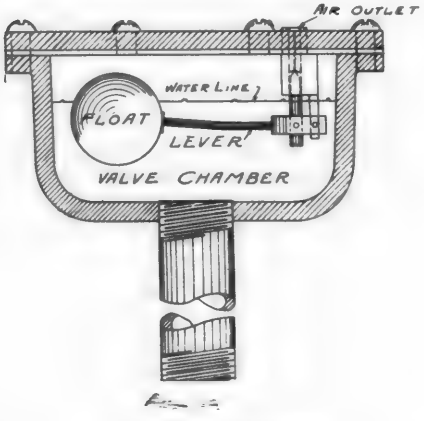
GORTON QUARTER-TURN PACKLESS VALVES, designed for all systems of steam, hot water, vapor and vacuum heating, which were described at length in the April issue, are the subject of a new catalogue, issued by the manufacturers, the Gorton & Lidgerwood Co., 96 Liberty st., New York. The quarter-turn type for radiators is made in four sizes and two styles, and the straightway type also in four sizes and two styles. The straightway type is also made with unions. A table of dimensions of each type is included. Size 3½ x 6 in. (standard). Pp. 16.

EVOLUTION OF HAND PIPE-CUTTING TOOLS, being a reprint of an article written by W. A. Phillis, is being sent out by the Borden Co., Warren, O., the company at the same time calling attention to the Beaver square-end cutter, which is described as "the last step in the evolution of hand pipe-cutting tools." It is stated that this cutter will give a perfect square-end cut without burr,

inside or outside. It is made in two styles, one for use with pipe running from ⅛-in. to 1 in. in diameter, and the other for pipe from ½ in. to 2 in. in diameter.

HUTCHISON FITTER, containing the necessary data to enable engineers, architects and heating contractors to select the proper sizes of the various appliances which make up the Hutchison system of vapor heating and to properly assemble such appliances, has been published by the Hutchison Vapor Heating Corporation, Washington, D. C. The booklet is essentially practical and takes up each appliance in detail, as well as showing views of typical installations. A special section is devoted to locating troubles in a system while another section takes up "Converting Existing Systems," the catalogue closing with a general form of specification. Size 3½x6 in. (standard) pp. 40.

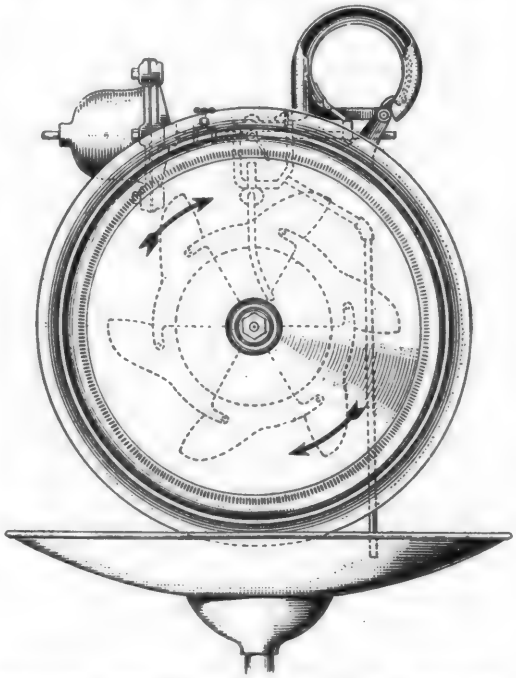
KING AUTOMATIC AIR VALVE for hot water heating systems is a unique product of the King Construction Co., North Tonawanda, N. Y., described in the company's Leaflet No. 9. This valve does not depend on the heat of the system to close it, but on the lifting power of the water acting on a hollow copper float. The collection of air in the valve chamber allows the float to drop slightly and this lowering of the float, acting through the lever, opens the air outlet. As the air passes out, the water rises in the valve chamber, lifting the float



KING AUTOMATIC AIR VALVE FOR HOT WATER HEATING.

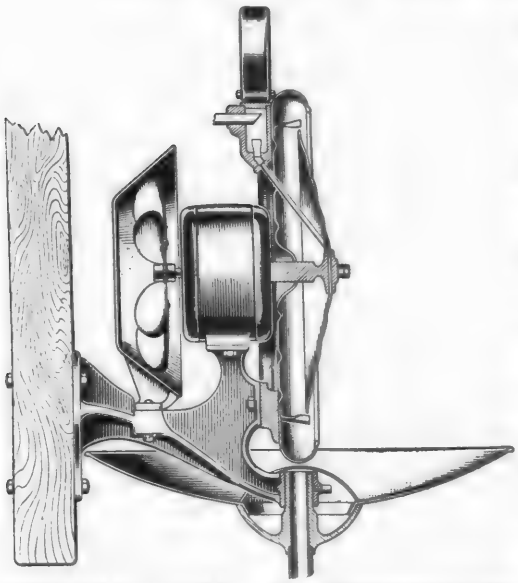
and thus closing the air outlet and preventing the water from escaping. The circular includes dimensions and instructions for installing. This company is also the manufacturer of the King Richon (K. R.) hot water heating system and the King system of pressure equalizing mains. The striking feature of this system is that in a steam boiler carrying steam, the water from the boiler is circulated through the heating pipes, instead of the steam.

NORMALAIR PATENTED HUMIDIFIERS, manufactured and sold by the Normalair Co., Winston-Salem, N. C., are the subject of a new catalogue in which the construction and operation of this unique apparatus is described in detail. In this device, the water is reduced to fine particles, or fog, by mechanical means,



FRONT VIEW OF NORMALAIR HUMIDIFIER.

within the machine itself, and since it is necessary only to feed water at any available pressure to the humidifier, and to conduct the waste to any convenient drain, each Normalair humidifier constitutes a complete humidifying unit. The water enters the humidifier from above and passes into the regulator chamber. From this point, depending on the automatic control, it passes directly to the center of the rapidly-revolving disc from which it is thrown by centrifugal force against the teeth of a copper grid at the circumference of the disc, where it is pulverized. The speed of the disc is sufficient to give the equivalent of over 100 lbs. pressure to the square inch on a thin film of water. Behind the device is a fan which forces the evaporation, as well as circulating the moistened air. Each unit is also equipped with an ingenious automatic humidity control. The complete apparatus is a development of the Hygrosso humidifier, which was on the market some years ago. The company



SECTIONAL VIEW OF MOTOR-DRIVEN NORMALAIR HUMIDIFIER.

is also sending out the figures of a test of a Normalair humidifier made in a room containing about 22,000 cu. ft. of space. The room was not heated, although the remainder of the building was. The humidifier ran day and night, with automatic control, without being touched, for nearly a month. The variation of room temperature was 18° F.; outdoor temperature variation, 35° F.; outdoor humidity variation, 55%; indoor humidity variation, 4%. Size of catalogue, 5½ x 9 in. Pp. 8.

An Example of Unit Classroom Heating and Ventilating.

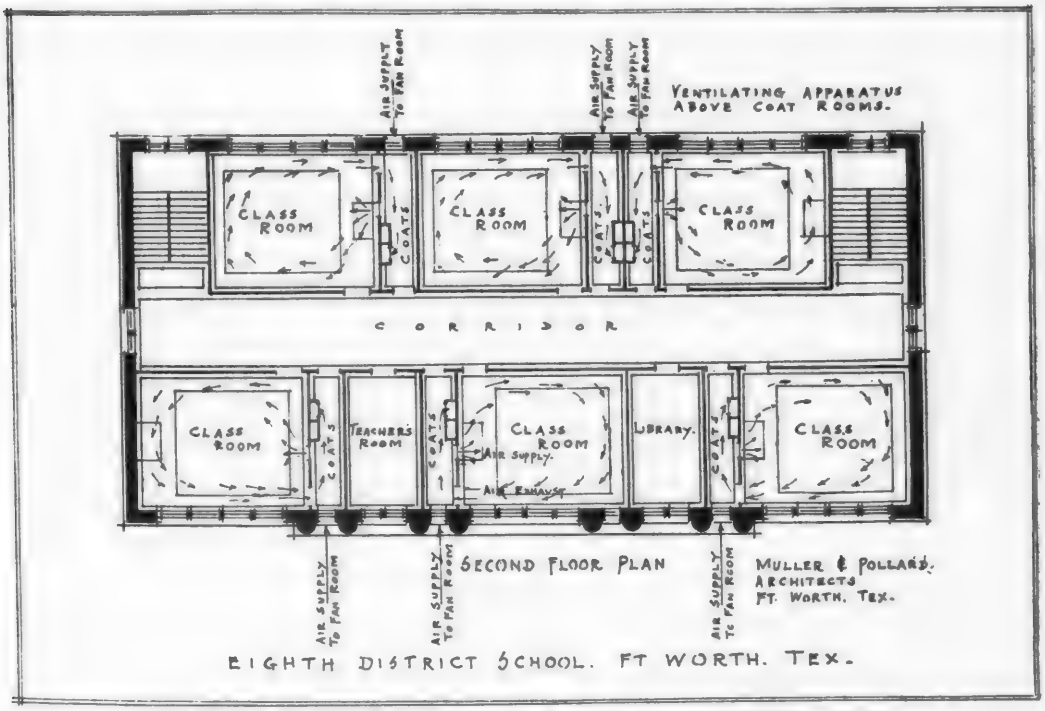
A rather unusual design of unit classroom heating and ventilation has been installed in two of the Fort Worth, Tex., schools, Mullard & Pollard, architects. Superintendent J. W. Cantwell co-operated actively in working out the ideas, which are the subject of an article in the American School Board Journal.

In the scheme in question the cloakrooms were divided horizontally, using a space 7 ft. high for the ordinary storage of children's clothing, and fitting the upper space for a small ventilating plant. Since the story height of the buildings is 13 ft., this arrangement was found entirely practical.

The windows in the coatroom were also divided and the upper halves were fitted with louvres. Through these louvres fresh air is drawn into the ventilating chamber over a series of steam heated coils, by a large electrically-driven fan. From the fan the air is forced through a diffusing outlet, placed about 7 ft. 6 in. above the floor line, into the classrooms.

The foul air from the classrooms is exhausted through a vent shaft located in the cloakroom, the door of the cloakroom being raised 18 in. from the floor line so that the air from the classrooms may freely circulate toward the exhaust register. The air flows up the vent shaft by natural draft.

It is stated that the operation of the



SYSTEM OF UNIT CLASSROOM HEATING AND VENTILATION.

fans was made entirely noiseless and the control of the fans is at all times in the hands of the teachers through the use of push buttons.

Co-operation Program for Engineers.

As showing more definitely the lines on which the committee on engineering co-operation of the principal engineering societies will work, the full text of the resolutions, as passed at the conference, are given herewith:

Whereas, The rapid increase in engineering activity of recent years has given rise to many problems vitally affecting the practice of engineering, and

Whereas, Existing agencies, through lack of proper correlation, appear inadequate for the solution of these problems; and in order that the resources of the profession may be made available for the most useful service to the nation, state and municipality, and that the practice of engineering may be rendered more efficient and less burdensome in those places where its development has been most difficult, and

Whereas, It is the sense of the Second Conference on Engineering Co-operation, representing societies, national, state and local, and comprising various branches of engineering, that these ends may be attained throughout a closer association and co-operation of engineering societies.

Be It Resolved, That there is hereby established a sub-committee, with F. H. Newell as chairman, and four other members to be selected by him, with instructions to prepare a plan for forwarding co-operation among engineering societies upon matters of general interest to the engineering profession, such plan to be presented for formal consideration at a third conference on engineering co-operation to be called by the sub-committee at such time and place as may seem to it desirable.

Be It Further Resolved, That the several organizations represented at this conference should be permitted to assist in defraying the expenses of the Committee on Engineering Co-operation and that the sub-committee should be requested to present to each of the societies represented an estimate of probable expenditures, including clerical service, together with recommendations for equitable pro-rating.

Be It Further Resolved, That this conference express its high sense of appreciation for the courtesies and hospitality extended by the Western Society of Engineers, Sub-Division 63 of the Chicago Association of Commerce and the Chicago Engineers Club, and hearty thanks therefor are hereby expressed.

Committee on Resolutions,
Paul Hansen, Chairman;
John Howe Peyton,
Albert J. Himes.

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TRADE AND MISCELLANEOUS NOTES

Coming Events.

June 14, 1916.—Annual meeting of the National Warm Air Heating and Ventilating Association, in Detroit, Mich.

June 20-22, 1916.—Thirty-fourth annual convention of the National Association of Master Plumbers, in Atlantic City, N. J. Headquarters at The Breakers (Hotel Rudolf).

June 21-24, 1916.—Twenty-eighth annual convention of the National Association of Master Steam and Hot Water Fitters, in Atlantic City, N. J. Headquarters at the Hotel St. Charles.

July 19-21, 1916.—Semi-annual meeting of the American Society of Heating and Ventilating Engineers, in Detroit, Mich. Headquarters at Hotel Statler.

Deaths.

P. A. Moulton, New York manager for the Sims Co., Erie, Pa., died suddenly May 24 while on a train bound for Albany. Henry Sims took personal charge of the New York office until arrangements could be made for a continued representation in the New York territory.

George F. Travis, New York, in charge of sales at the New York office of the Powers Regulator Co., Chicago, died May 21, at his home in Belleville, N. J., of typhoid fever. He was for 11 years with the Powers Regulator Co.

John Jeffreys, chairman of the firm of J. Jeffreys & Co., Ltd., London, England, died April 21 after a short illness. He was a member of the American Society of Heating and Ventilating Engineers.

Edward H. Robinson, vice-president of the Robinson Furnace Co., Chicago, Ill., died at his home in Wilmette, Ill., April 23. He had been in the furnace business for nearly 35 years.

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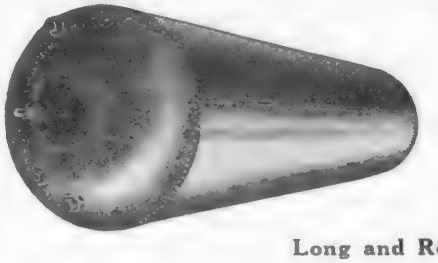

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DAHLQUIST MFG. CO., 40 West 3rd Street, BOSTON, MASS.

Please mention THE HEATING AND VENTILATING MAGAZINE *when you write.*

Miscellaneous Notes.

Chicago, Ill.—The Chicago & Northwestern Railway has added a "service inspector" at the new terminal in Chicago who will assume the attitude of an exacting patron and report on everything, including the heating, lighting and ventilation of passenger cars.

Columbus, O.—By refusing to review the case, the Ohio Supreme Court upheld the Hamilton County Appellate Court in refusing to order the alteration of a contract between Michael J. Gibbons and the J. H. Day Company. Mr. Gibbons agreed with the Day company to install a steam heating system and the verbal contract was reduced to writing. Mr. Gibbons claimed that an error was made in writing out the contract regarding the fulfilment of the plans and specifications. Common Pleas Court Judge Geoghegan ordered the contract altered to include this addition, but the higher courts held that there was no evidence adduced to shoy that the scrivener made an error, so that the contract must stand as written.

Portland, Ore.—Because of lack of funds, the Council has decided that it should not attempt to appropriate any money from the general fund to enlarge the heating system in the public auditorium to heat the City Hall. This arrangement, it was figured, would involve an additional outlay of $15,000, although there would be a saving in heating both buildings from one plant of about $3,000 a year.

St. Joseph, Mo.—Jessie Irene Gibson, a nurse at the Ensworth Hospital, has filed a $40,000 personal injury suit against the Deaconness Home and Hospital Association and the C. F. Rock Plumbing & Heating Company, alleging that a sterilizer placed in the hospital by the contracting company was defective. When she started to operate it, she was seriously injured by steam blowing a metal door against her face.

Burlington, Ia.—Hints on the care of furnaces and boilers during the summer months are given out by the extension engineers of the Iowa State College as follows: "A furnace wears out faster in the summer than the winter, largely because it is not properly cleaned and cared for unless fired. As soon as no more fire is needed, give the furnace a thorough clean-

Mail the Coupon for Your Copy

of this big catalog, which contains lots of valuable information, data, charts and suggestions for specifications on Air Line and Return Line Vacuum and Vapor Heating Systems, and illustrates and describes thoroughly the big line of RELIABLE Vacuum and Vacu-Vapor Heating Equipment—RELIABLE Vacuum Pumps, VacUstats, Vacu-Traps, Vacu-Checks, Vacu-Graduate Packless Radiator Valves, "4 V" Vent Valves, etc. This will not obligate you. We want you to see this catalog. You will be interested in it!

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General Offices, Cleveland, O.

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H.& V.-616

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ing on the soot and ash-covered surfaces with brushes and scrapers. Sweep and scrape all smoke passages thoroughly. Take off the smoke pipe, clean out all soot and see that the chimney is clean where it goes in. Put it back in place, or, better still, put a cap over the chimney hole and store the pipe in a dry place. Put about a peck of unslacked lime in a box in the fire-pot of the furnace. This will prevent the gathering of moisture and consequent rust. Leave the furnace doors slightly open to allow a circulation of air."

Dayton, O.—A committee of the Industrial Commission of Ohio is engaged in drawing up a complete code for factory sanitation, lighting and ventilation in the factories of that state. After approval by the industrial commission, the new code will have all the effect of law. It is stated that many features of the code will be patterned after the practice at the National Cash Register plant where factory conditions, the committee agrees, are as nearly ideal as can be found in the state. The full membership of the committee is as follows: C. Routsong, factory inspector at the plant of the National Cash Register Co., Dayton; Orra B. Chapman, member of the state legislature; E. R. Merrille, Hamilton; Charles Atherton, Cincinnati; Dr. E. R. Hayhurst, Columbus; Dr. Sidney McCurdy, Youngstown; J. T. Donnelly, Cincinnati.

Chicago, Ill.—Some of the arguments against the establishment of official organs for trade associations are expressed in a letter written by William J. Lang, past-president of the Illinois Association of Master Plumbers, and printed in *Domestic Engineering*. Mr. Lang's letter refers to a proposal to establish an official organ for the National Association of Master Plumbers. He says, among other things: "I think any movement to establish such a publication is a gross imposition upon the rights of the trade press, which has loyally and ably served us for over 25 years and has co-operated with us in many progressive and constructive projects for the good of our cause, with the result that we are indebted to these trade papers for much of the progress which we, as an organization, have made. . . . The trade press has always been able to give us all the news and educational matter that we needed and has always been ready and glad to assist and promote our interests in every way possible. . . . By becoming publishers we would be going out of our way to reduce the modest appropriations which the manufacturers and jobbers make from time to time for trade paper advertising. It is clearly an imposition for any association, state or national, to solicit advertising which the manufacturers and jobbers cannot gracefully refuse, and I hope the Central Supply Association and kindred organizations will rescind their action in permitting their members to buy space in any official organ, published and financed by members of plumbers' organizations.

Jenkins Bros. Gate Valves

For either steam or water lines, where strong, compact, full opening gate valves are desired, install **Jenkins Bros.** Diamond Brand. Made of brass or iron, in three patterns, Standard for 125 pounds, Medium for 175 pounds and Extra Heavy for 250 pounds steam. Also in Cast Steel for high pressure superheated steam and hydraulic service.

Consult Catalogue No. 20

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New York Boston Philadelphia Chicago Montreal London

SPECIFY— FOXBORO —INSTRUMENTS

TRADE MARK

TO INDICATE or RECORD TEMPERATURES and PRESSURE

They have a distinctive quality with a fineness of mechanical detail which insures Accuracy and Durability under the hardest Service

THE FOXBORO COMPANY, FOXBORO, MASS.

New York Chicago St. Louis Birmingham, Ala. San Francisco

Please mention THE HEATING AND VENTILATING MAGAZINE *when you write.*

Our national association has enough litigation on its hands at present, and it would not be good judgment to allow articles or lists of members and manufacturers to appear in official publications, which might be misconstrued by the United States Government."

Eastern Supply Association will hold its next meeting in New York, June 14. Headquarters will be at the Hotel Astor.

Joliet, Ill., will be made an open shop town if the plans of the Master Builders' and Supply Dealers' Association are carried out. The master steam fitters, master plumbers and sheet metal contractors were not able to reach a satisfactory agreement with the various unions and combined forces as stated.

New York.—The indictment filed March 15, 1915, against 20 master plumbers, members of the Master Plumbers' Association of New York City, charging conspiracy, has been dismissed by Judge Rosalsky. This action was taken after the district attorney stated that there was not sufficient evidence to warrant a trial and that no evidence had been shown to prove a conspiracy.

American Boiler Manufacturers' Association will hold its 28th annual convention in Cleveland, O., June 19-20. Headquarters will be at the Hollenden Hotel.

Portland, Ore.—It has been decided to install a heating plant in the $500,000 high school to be built this summer in Portland. Bids for the structure were opened, but they did not include proposals for the heating, as it had been thought possible that the high school would be heated from the City Hall plant. This, it has been found, is impracticable, owing to an intervening rock ledge.

Syracuse, N. Y.—A new Agricultural College building, to cost $300,000, will be erected at Syracuse University. It will be the gift of Mrs. Russell Sage.

Cincinnati, O.—A new three-year working agreement has been drawn up between the Steamfitters' and Helpers' Union and the Cincinnati Master Steamfitters' Association. The new agreement took effect May 1 and by its terms the men will receive the present wages for the first two years of the contract, a 5% increase going into effect May 1, 1918, to remain in force for the third and last year covered by the contract; also not more than one helper will be allowed to a steamfitter. The hours of labor remain the same.

New York Heating and Ventilation School Alumni Association, formed of men who have taken the course of lectures given by Charles A. Fuller, in New York, held its first meeting May 16 in the rooms of the Modern Science Club, Brooklyn. M. J. Sage acted as chairman and remarks were

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E. R. Graham, Architect
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Every square foot of J-M Heat Insulation used shows a real saving—a saving that appears on the ledger.

Your client is assured of getting the proper insulation because of the comprehensiveness of the J-M Line. Twenty-one distinct types that will meet any service condition.

You can be sure of the proper application of these materials, because J-M Contract Departments will install them in any plant in the country.

There is convenience and security in purchasing an insulation from one concern who applies it and vouches for its performance through J-M Responsibility.

H. W. Johns-Manville Co.

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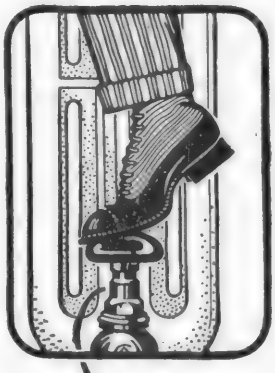

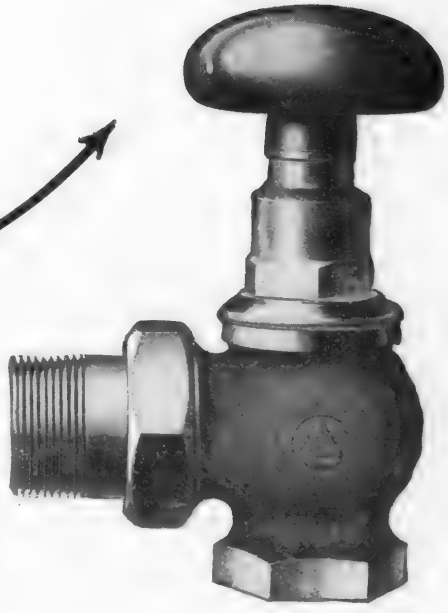

STRONG & STURDY—

a chance blow cannot bend this handle stem

Abuse of all kinds such, for example, as stepping on the handle, has no effect on it.

These valves are fool proof and cannot be tampered with from the outside.

They are strong and sturdy wherever strength is required.

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DETROIT, U. S. A.

CANADIAN DETROIT LUBRICATOR COMPANY LTD WALKERVILLE, ONTARIO, CANADA

LARGEST MANUFACTURERS OF RADIATOR VALVES IN THE WORLD

made by James A. Donnelly, Frank K. Chew and Charles A. Miller.

National Committee of the Confederated Supply Associations announces that J. J. Cosgrove, of Philadelphia, has taken charge of the committee's public comfort station work as engineer-director, with headquarters at 261 Broadway.

University of Wisconsin College of Engineering will conduct its eighteenth annual summer session at Madison, Wis., during the six weeks' period beginning June 26. Special courses will be given in chemistry, electrical, steam and hydraulic engineering, gas engines, machine design, mechanical drawing, etc. Further information regarding the course may be obtained from F. E. Turneaure, dean, Madison, Wis.

Central Supply Association will hold its summer meeting in Chicago June 22, 1916. Sessions will be held at the Auditorium Hotel.

American Institute of Chemical Engineers, which will meet in Cleveland, June 14-17, will have an elaborate program of professional papers, including one on "Sound" by Dr. Daton C. Miller of the Case School of Applied Science.

Ohio Society of Mechanical, Electrical and Steam Engineers will hold its next meeting in Cleveland, O., June 22-23.

National Pipe and Supplies Association met in Pittsburgh, Pa., May 8-9, with an attendance of nearly 500 members and guests. President Alexander B. Pierce called the meeting to order and after the preliminary business was taken care of introduced Harry A. Wheeler, vice-president of the Union Trust Co., of Chicago, who spoke on "By-Products of the European War." An address was also delivered by N. O. Nelson, of St. Louis, on "Co-operation." The convention passed a memorial resolution on the death of its recent treasurer, the late George W. K. Taylor. New officers were elected as follows: President, Alexander B. Pierce, N. O. Nelson Mfg. Co., St. Louis, Mo.; first vice-president, J. S. Smith, the Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.; second vice-president, Frank M. Sheldon, Braman, Dow & Co., Boston, Mass.; secretary-treasurer, Geo. D. McIlvaine, 908-9 Oliver Building, Pittsburgh, Pa. Executive committee: Wm. Q. Wales, Brown-Wales Co., Boston, Mass.; Geo. V. Denny, Georgia Supply Co., Savannah, Ga.; John S. Simmons, the John Simmons Co., New York City; J. B. Rahm, the United States Supply Co., Omaha, Neb.; C. J. Clark, the Hunter & Dickson Co., Philadelphia; Geo. B. Limbert, Geo. B. Limbert & Co., Chicago; L. C. Huesmann, the Central Supply Co., Indianapolis; I. F.

THE Webster

AIR CONDITIONING APPARATUS

WEBSTER Air Washer and Air Conditioning Apparatus is constantly demonstrating its ability, under a wide variety of exacting conditions, to effect and maintain any desired temperature or humidity.

Whenever a highly efficient and thoroughly dependable air washing, air cooling or air conditioning system is required, WEBSTER Apparatus, by reason of its exclusive advantages, is selected by engineers, architects and owners.

No air conditioning problem is too difficult for us to solve. Our air conditioning engineering staff is second to none in existence. Give us the opportunity to prove this by taking up your next air conditioning problems with us.

We guarantee results in any problem we undertake.

Catalogue sent on request.

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Main Office and Factory CAMDEN, N. J. Point and Pearl Sts.

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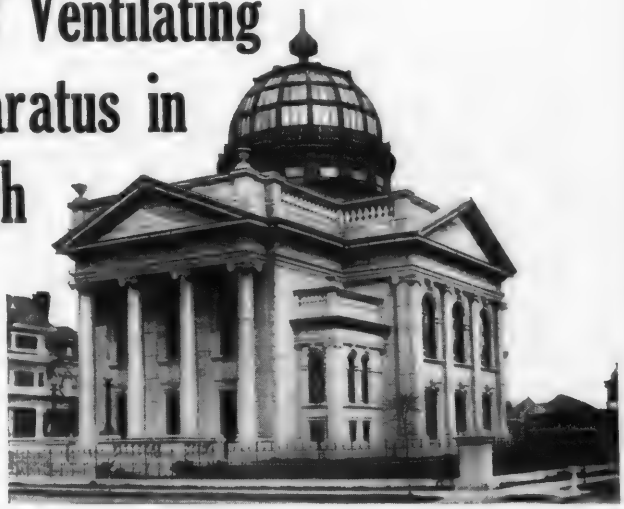
Sturtevant (REG. U. S. PAT. OFF.) Ventilating and Cooling Apparatus in a Southern Church



In the Lutcher Memorial Church in Orange, Texas, is a system for ventilating and cooling the auditorium and Sunday School room. The apparatus is guaranteed to maintain a temperature of 75° F. when outside temperature is 110° and with inside humidity of approximately 50% at a point 6 ft. from the floor line.

The apparatus comprises Sturtevant Multivane Fans, direct current Motors and a special Sturtevant Air Washer with brine cooling coils installed between spray chamber and eliminators. Both fresh air apparatus and exhaust apparatus were installed.

In addition to the Heating and Ventilating Apparatus, Sturtevant 100 Kilowatt Generating Set and Sturtevant Organ Blower were installed. The latter operates on storage batteries charged by the Generating Set. Write us for information on any problem relative to heating, ventilating, or air-conditioning.

B. F. Sturtevant Company

Hyde Park, Boston Massachusetts

And All Principal Cities of the World

Young, the Young & Vann Supply Co., Birmingham, Ala.

Philadelphia, Pa., was chosen as the convention city for 1917.

Manufacturers' Notes.

American Radiator Co., Chicago, Ill., has opened a branch office in Grand Rapids, Mich., at 3 Perkins Building. Clare R. Shafer has been appointed manager.

King Ventilating Co., Owatonna, Minn., reports a number of important contracts for ventilating farm buildings with the King system, including the farm buildings of Dr. Graham at Rochester and a large creamery plant at Moose Jaw. The company states that more attention is being paid than ever before to the air conditions in buildings housing cattle.

Sun Absorber Co., San Bernardino, Cal., has located in that city, with quarters on South E St. The company will manufacture an improved solar heater, the invention of George Wilcox.

Simonds Heating & Specialty Co., Fremont, Mich., has moved its main offices to Detroit.

Rector Gas Heating Co., Kansas City, Mo., has moved its offices to St. Joseph, Mo., where quarters have been opened at 807 Francis St. The company makes unit gas heaters which also serve to furnish

SUPREME
FOR
RESTAURANTS and LUNCH ROOMS

ILG SELF-COOLED MOTOR
PROPELLER FANS

ILG ELECTRIC VENTILATING CO.
158 Whiting Street, CHICAGO

Aug 15th 1915

INSPECTOR PRAISES SCHOOL ARRANGEMENT

Frank A. Hall From State Department Says High School is Best He Has Ever Seen.

High compliments were paid the arrangement of the Ithaca High School by Inspector Frank A. Hall of the state department of education, who inspected the building yesterday. Mr. Hall made a tour of the building with the building committee, C. J. Rumsey, S. L. Howell and P. F. McAllister, Architects Miller and Mallory, and members of the firm of Driscoll Bros. & Co., the contractors who erected the structure. The whole day was spent in making the inspection, 97 rooms, including corridors, gymnasium and toilets, being tested.

The test was made in order to make sure that the building complied with the state regulations, which demand 30 cubic feet of air a minute, 200 cubic feet of air space, and fifteen square feet of floor surface be supplied each pupil. Mr. Hall said: "In all my experience of more than eleven years in inspecting state schools of this size the Ithaca High School is the best I have seen." He said that in most of the schoolhouses he had to do the adjusting of the air supply and exhaust himself, but that here he found it all properly done, very little adjustment being needed.

Mr. Hall also remarked upon the concrete corridors in the basement through which the air has to pass before being forwarded to the various rooms and corridors. In most buildings of this kind the air is simply drawn through tech pipes, which are difficult to clean. In the Ithaca High School, however, cleanliness will be an easy matter.

The air of the school is supplied by two fans with a capacity of 55,000 cubic feet of air a minute, driven by two twenty horse-power electric motors. Three other fans control the exhaust apparatus. The adjustment of the air supply is effected by dampers in the flues carrying the air to the rooms and by deflectors at the inlet openings.

Sturtevant (REG. U. S. PAT. OFF.) Apparatus In the Ithaca High School

Read the Clipping

The heating and ventilating apparatus in the Ithaca High School was manufactured by us and installed under our supervision. It goes to show that Sturtevant jobs give satisfaction—that Sturtevant Apparatus is superior to all other makes—and that Sturtevant Service is never equalled.

The apparatus included two No. 13 Double Width Multivane Blowers, two No. 6 Multivane Exhausters, one No. 4 Multivane Exhauster and Sturtevant London Type Heater sections.

We will co-operate with architects or heating and ventilating engineers on all problems of heating, ventilating, or air conditioning.

B. F. STURTEVANT COMPANY

HYDE PARK, BOSTON, MASSACHUSETTS

And All Principal Cities of the World

ventilation. F. B. Daggett, for years engineer at the State Hospital in St. Joseph, will have charge of the company's engineering and mechanical department.

H. B. Smith Co., Westfield, Mass., manufacturer of the Mercer and Mills boilers, also radiators and other heating supplies, announces the removal of its New York offices to 10 East 39th St. A large showroom has been equipped at this address, with a mezzanine floor for the offices. The New York office is in charge of J. C. Faulkner.

Moline Heat, as the Moline Vacuum Vapor Heating Co., of Moline, Ill., is now known, will build a $20,000 addition to its plant. It is also announced that Herman Nelson, president of the company, will retire from the Moline Heat & Construction Co. and devote his entire time to Moline Heat.

National Radiator Co., Johnstown, Pa., has appointed H. Tyler Kay advertising manager. Mr. Kay was formerly advertising manager for the Consolidated Engineering Co., Chicago.

Bishop-Babcock-Becker, Cleveland, O., has appointed Edward Dunston as a sales representative, with headquarters at the company's branch office in Pittsburgh.

Molby Boiler Co., Inc., New York, is now located in its new quarters at 101 Park Ave., where its line of Molby downdraft heaters is on display. The company's telephone number is Vanderbilt 5061. E. C. Molby, who is at the head of the company, reports a rapidly-growing demand for this heater, which has necessitated larger quarters.

Newport Boiler Co., Chicago, Ill., manufacturer of the Newport adjustable magazine-feed boiler, is now settled in its new quarters at 105 South Dearborn St., where the boiler is displayed, the new location being easily accessible from any point in the business district of Chicago. The telephone number is Randolph 2410.

Kieley & Mueller, New York, announces the removal of its Chicago offices to 232 West Erie St., where greater facilities have been provided for taking care of the firm's customers. The company's offices were formerly located on Wells St. James McAlear is the company's western manager, in charge of the Chicago office.

McAlear Mfg. Co., Chicago, Ill., is the changed name of the Automatic Vacuum Pump Co. The main offices and factory have been moved to 223 West Erie St. James M. McAlear is at the head of the company which manufactures the McAlear thermo vent automatic air valves, the McAlear perfection radiator traps, the McAlear air line vacuum pumps and the Sparks vacuum pumps.

Robert A. Keasbey Co., New York, has moved its main offices to 445-453 West St. and 165-169 Bank St. (corner Bank and West Sts.), the new telephone numbers being Chelsea 8300-1-2-3-4. A large warehouse, equipped with modern facilities for receiving and shipping, together with a complete trucking equipment, has been occupied by the company at this address, carrying complete stocks of pipe and boiler coverings and other materials handled by the company. In the notice of removal the

SPRAGUE ELECTRIC
OZONATORS

Keep the air pleasing and Wholesome in close rooms, banks, factories, toilets, etc.

Combination Ozonator and Electric Fan

Approved by the National Board of Fire Underwriters
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Sprague Electric Works
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AIR CONDITIONING
never involves too complex a problem if you avail yourself of our advice.
Carrier
Engineering Corporation
39 Cortlandt St., New York
Boston Philadelphia Buffalo Chicago

SIXTY "VENTURA" FANS

The photograph shows four out of the sixty "Ventura" Fans that have been installed in the plant of the Firestone Tire and Rubber Company in Akron.

Did you ever go into a rubber plant? Of all factories a rubber factory is probably the most difficult to provide with pure, fresh, wholesome air. Step through the doorway and your nostrils are assailed with dozens of offensive odors—the stifling smell of the cheaper grades of crude rubber—the odors from the scores of different compounding materials that are used—the fumes from the chemicals used in the cementing processes—and the clouds of steam which are emitted from the steam presses.

Can you imagine a more difficult task to put to any ventilating system than to keep the air in such a factory pure and clean?

But you will find the air in the great Firestone Plant at Akron as pure and fresh as anyone could wish.

It is kept so by a huge battery of sixty "Ventura" fans and numerous Sirocco fans placed throughout the building.

Notice how simple the installation of a "Ventura" Fan is. No expensive construction work necessary. Just select the place that you want ventilated—put the "Ventura" in the upper half of a window or in a hole in the wall—hook on your power and it is ready to either draw out the fumes from inside or pour in a great volume of air from the outside.

Haven't you a place about your plant that ought to be ventilated?

Let us show you how a "Ventura" will do it and what it will cost. Write and ask us about "Ventura" Fans No. 9-A.

AMERICAN BLOWER COMPANY

DETROIT, MICHIGAN

BRANCHES EVERYWHERE

company calls attention to the fact that it has been in business thirty years, dealing with every phase of the application of asbestos materials.

G. M. Parks Co., Fitchburg, Mass., has appointed Wilbur R. Fitch on its engineering staff. Mr. Fitch was for several years with Williams & Cole, of Boston, and was previously with Albert B. Franklin, of the same city.

Sims Co., Erie, Pa., reports an important demand for sugar juice heaters through its New Orleans representative, the Hautman-Loeb Co. During the past month the company has received orders for one 800-ton, one 900-ton and five 1,500-ton capacity juice heaters, all of which are for export to Cuba. Heretofore heaters for this purpose were furnished from France and England. The company has also furnished a number of special liquor heaters to the Aluminum Company of America, those sold so far this year making a total of twelve heaters furnished this plant, each being rated at 6,000 H.P. The repeat orders cover a period of four years and are an indication of the satisfactory service obtained with this equipment. The heaters are made with steel shells, cast iron tube plates and straight, seamless drawn, 1½-in. O.D. steel tubing, using the company's standard floating head construction. The Sims Company reports that its business so far this year shows an increase of 100% over the same period last year, all of which the company is able to take care of in its new plant without additional equipment.

Parker Supply Co., New York, manufacturers of the Parker damper quadrant, expansion bolts and other specialties, is now located in its new quarters at 785-787 East 135th St., where more commodious quarters have been provided for the company's increasing business.

New Incorporations.

Lafayette Plumbing & Heating Co., Lafayette, Ind., capital $10,000. Incorporators: Guy M. Smith, George P. Herzog and R. D. Reser.

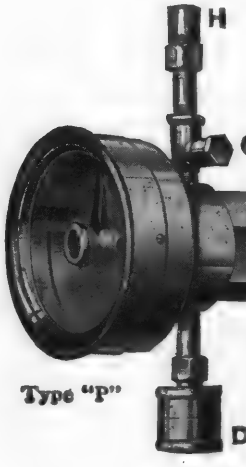
Soleau-Rossman Co., Belleville, N. J., capital $2,000, to engage in heating and ventilating contracting business. Incorporators: Marvill D. Rossman, Clara E. Soleau, both of Belleville, and Fred C. Hunter, of New York.

Auto Cooling and Heating Corporation, Dover, Del., capital $500,000, to manufacture chemicals for producing refriger-

H&M Thermometers

Regulators

Automatic Temperature and Pressure



Type "P"

Tycos mercury operated, steel construction Recording Thermometers, Angle and Straight Stem Thermometers, All Glass Engraved Stem Thermometers, Hygrodeiks and Hygrometers, Thermo-Electro and Radiation Pyrometers.

The *Tycos* Mercury Operated Recording Thermometer

Mark this: — Every Instrument bearing H & M *Tycos* makes honest claim to supremacy because every manufacturing step is carefully worked out in detail, applications carefully studied.

Put your problem up to us. Our experience will prove very valuable to you. Our service prompt and efficient, suggestions and literature free. Command us.

The H&M Division
Taylor Instrument Companies
Rochester, N.Y.

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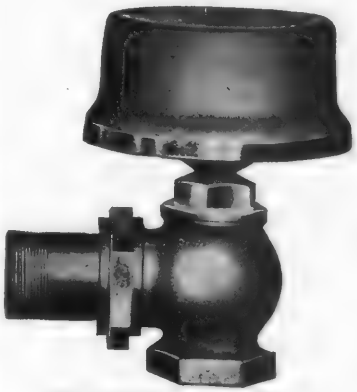
The stability of the Johnson Service Company, and the exclusive merits of the Johnson System offer you the greatest value in temperature regulation.



The indestructible sylphon metal diaphragm valve

The Johnson Service Company is the pioneer manufacturer of temperature regulation system. The stability and responsibility of the Company are established by years of big successful business, the superiority of the Johnson System is demonstrated by hundreds of installations in high-grade school buildings, office buildings, apartments and residences. It is the Johnson System that has made temperature regulation a standard equipment for high-grade buildings.

JOHNSON SYSTEM
of TEMPERATURE REGULATION

—automatically maintains a uniform temperature and effects fuel economy—insures the consistent comfort absolutely essential to efficient school work.

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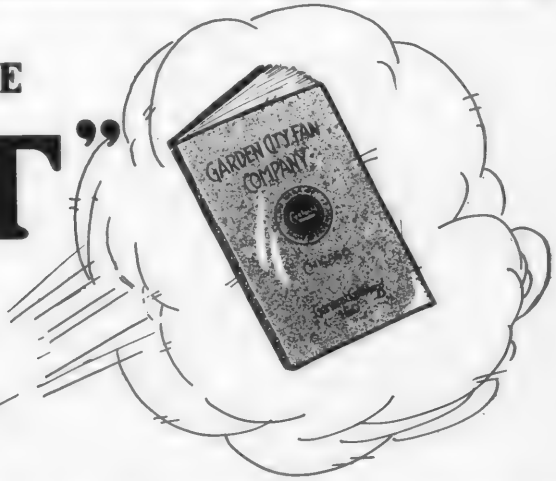
New York **Chicago** **Milwaukee, Wis.**

THIS BOOK HAS MADE

"A HIT"

With Hundreds of Engineers, Architects and Contractors.

It's FREE for the asking



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Established 1879 **CHICAGO, ILL.**

L. J. Wing Mfg. Co.
352 W. 13th Street
New York City

H. Mishler Co.
Penobscot Bldg.
Detroit, Mich.

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ation and cooling of any kind. Incorporators: Scott S. Baker, Clarence J. Jacobs, Harry W. Davis, all of Wilmington.

World Heating and Ventilating Co., Akron, O., capital $60,000. Incorporators: H. D. O'Neall, T. C. Marshall, S. W. Harris, J. W. Hood, W. E. Wilson, M. S. Long and F. L. Hood.

George Sykes Co., New York, capital $50,000, to engage in general contracting, plumbing, lighting, heating, ventilating, electrical and mechanical engineering, etc. Incorporators: George Sykes, Arthur B. Graham and William H. Woolley, all of New York.

Spartanburg Plumbing & Heating Co., Spartanburg, S. C., capital $5,000. President, secretary and treasurer, J. J. Lax; vice-president, C. C. Wyche.

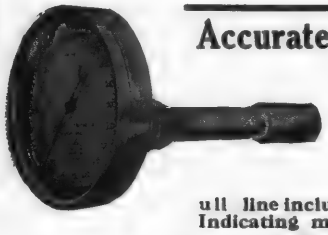
Unit System of Heating & Mfg. Co., Los Angeles, Cal., to manufacture a newly patented gas furnace, the invention of J. P. Chandler of San Francisco.

W. H. Simpson, Inc., Olean, N. Y., capital $20,000, to conduct a heating, plumbing and lighting contracting business. Incorporators: J. Gabler, C. W. Stackhouse and W. H. Simpson.

Zindle Plumbing & Heating Co., Akron, O., capital $30,000. Incorporators: Gilbert Zindle and others.

National Heating & Ventilating Co., Bloomington, Ill., capital $10,000. Incorporators: P. H. Magiri, Ben. Cones and Charles L. Will.

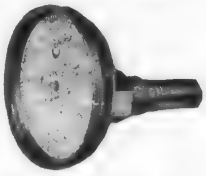
Joseph H. Duffy, Inc., New York, capital $10,000, to conduct a contracting business in heating, plumbing and sanitary en-



Accurate Service Is Assured When You Use

Standard Indicating and Recording Thermometers

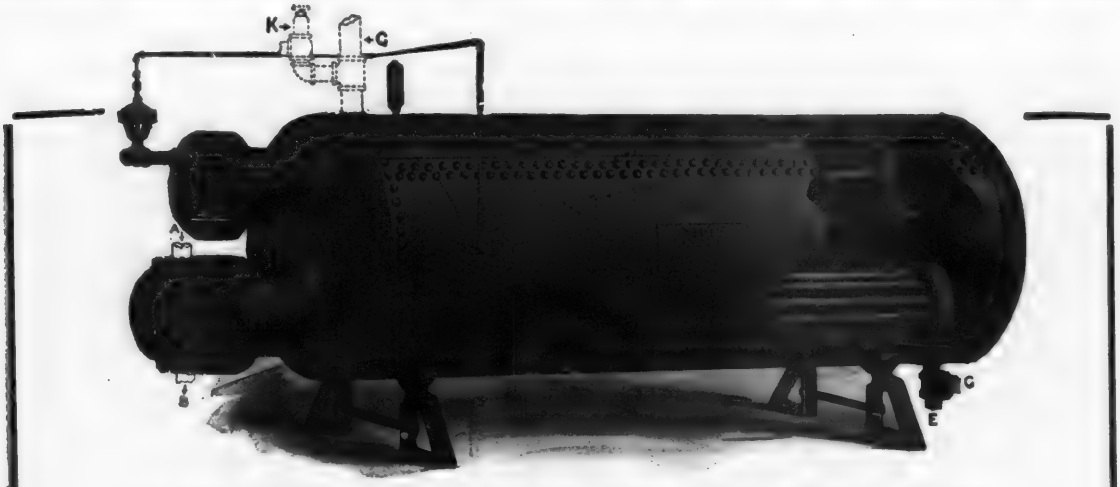
Guaranteed Correct



Our line includes seven types of recording thermometers and a special line for mechanical uses Indicating mechanical thermometers are furnished with extensions from 2 to 30 in. in length

All thermometers are double and not breakable.

STANDARD THERMOMETER COMPANY Clinton and Shirley Streets **BOSTON, MASS**



WHEN THE HOT WATER DEMAND RUNS HIGH

Our large experience in manufacturing heaters for laundries has developed the fact that there is not always enough exhaust steam to heat all the water to the temperature required. This is always the case with a wet-wash laundry. For a high hot water demand use the

SIMS CLEAN E-Z HEATER, TYPE D.

This heater is supplied with two sets of straight, seamless drawn brass tubes, the lower for exhaust steam, located in the coolest water. The upper set of tubes is for live steam direct from the boiler, controlled by a thermostat.

Our Bulletin HL-2 gives full particulars of Sims Heaters for laundries, hotels, hospitals and other service. Consultation free. All work guaranteed.

THE SIMS COMPANY **18th Street, Erie, Pa.**

DABONITE

CENTRAL STATION PIPE COVERING

Dabonite Central Station Pipe Covering is made up of alternate layers of plain and indented long fibre asbestos felts, with a heavy waterproofed jacket on the outside and with the edges wire stitched.

Broken Joint Method

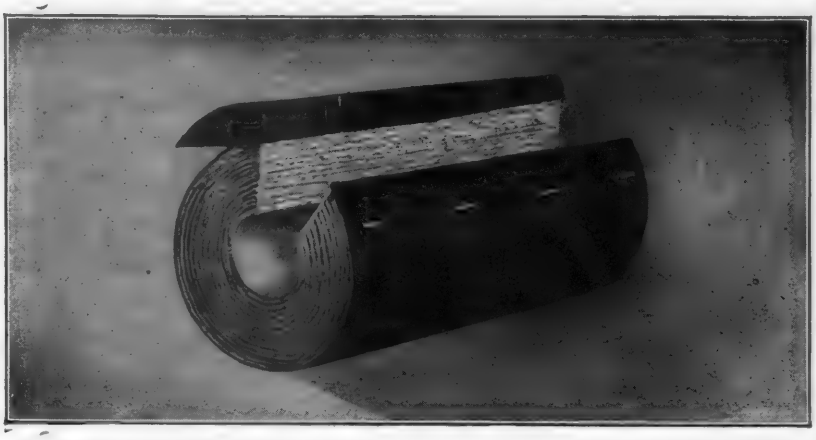
Dabonite Covering is made in sections, three feet long and for all sizes of pipe up to and including 30 inches.

Dabonite Covering can be furnished 1 inch, 1½ inch, 2 inches or 3 inches thick, either for straight joint or broken joint application.

Dabonite Covering is made accurately to size, strong for handling and is easy to apply.

In purchasing a pipe covering for underground heating mains, the principal points to be considered are: **insulating efficiency, durability and moisture resistance.**

Dabonite Central Station Pipe Covering was designed to meet these conditions. **First:** By placing the layers of asbestos felts so as to make the air cells unbroken to the highest degree, and by making the joints lap so that the covering is continuous. **Second:** By making the covering all asbestos, no vegetable matter of any kind. **Third:** By placing around the covering a substantial waterproof jacket, securely fastened.



Straight Joint Method

D. A. BONITZ COMPANY, Fisher Building, Chicago, Ill.

gineering. Incorporators: W. L. Sayers, W. J. Powell and V. J. Duffy.

Modern Plumbing & Heating Co., Paris, Tex., capital $5,000. Incorporators: P. Kahn, P. J. Reaney and W. E. Thacher.

John O'Neill & Sons Co., Peoria, Ill., capital $20,000, to conduct a heating and plumbing contracting business. Incorporators: Andrew J. O'Neill, Patrick Fitzpatrick and James F. Smith.

Erickson & Lindleaf Co., Omaha, Neb., capital $10,000, to conduct a heating and plumbing business. Incorporators: Carl Johnson, Erick Erickson and Fred C. Lindleaf.

Oak Park Heating Co., Oak Park, Ill., capital $2,500. Incorporators: James F. Lavelle, A. M. Lavelle and George E. Lavelle.

New Firms and Business Changes.

Trenton Plumbing & Heating Co., Trenton, N. J., has removed to new and larger quarters at South Broad Street and Greenwood Avenue.

A. F. Essig, Sibley, Ia., who has been connected with Cajacob Bros. for the past few years as head of their heating and plumbing departments, has gone into the heating and plumbing business for himself in Sibley.

"CONNERSVILLE"

VACUUM CLEANERS EVERYWHERE

For installation in Residence, Apartment, School, Office Building, Sanitorium, Hotel, Factory, Church, Theatre, Hospital, Laundry, Library, Public Building, etc.

The Sanitary Way

Buy a "CONNERSVILLE" and Avoid Dust Dangers and Daily Drudgery

United Vacuum Appliance Co.
Connersville, Ind.

Service Is What You Want

and that is the very thing we want to give you—and it is the identical thing you will get in any

13160

Mueller Reducing and Regulating Valves

you may select for water, steam, air, oil, gas, etc. Let us know your wants and we will suggest to you a valve that will meet your requirements. We want your inquiry so that we may give you complete information. Get our No. 5 Catalogue.

H. Mueller Mfg. Co.
Decatur, Ill.

New York
145 W. 30th St.

San Francisco
589 Mission St.

Davis Pressure Regulators Save Steam

DAVIS

When economy suggests or necessity demands the use of steam at less than boiler pressure use A DAVIS REDUCING VALVE.

This automatic device saves steam by delivering the exact amount required and no more. Being simple in construction and positive in action you may rely upon it for efficient service.

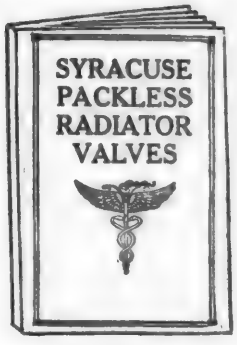
For forty years Davis Valves have been used by men of experience who demand the best possible results from their equipment.

G. M. DAVIS REGULATOR CO.
436 MILWAUKEE AVENUE CHICAGO
New York Boston Philadelphia Pittsburgh San Francisco

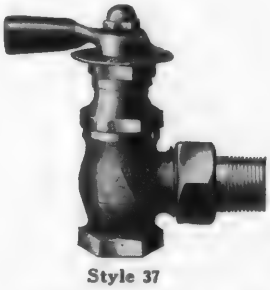
Send for Complete Catalog No. 8

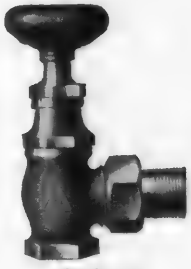
VALVES

THREE NEW ONES



Catalogue


Style 37


Style 38

ALL OF THEM DANDIES!

Send for the catalogue which tells about these new style valves.

SYRACUSE FAUCET AND VALVE COMPANY

Office and Factory
Syracuse, N. Y.

Sweet's Catalogue Page 1249
GEO. A. WELD CO., 79 Milk Street, Boston

220-224 West 42nd St.
New York City

Herrin Plumbing & Heating Co., Herrin, Ill., has taken over the business of the Egyptian Plumbing Co. of that place. T. J. Abbott is manager of the Herrin Company.

Lafayette, Ind.—The newly organized Lane-Pyke-Werkhoff Co., of Lafayette, has been incorporated with a capital stock of $40,000, instead of $10,000, as previously announced. The new firm is a consolidation of the Lane-Pyke Company and Abner E. Werkhoff, both of Lafayette.

Hunter Heater Co., Hannibal, Mo., has elected the following officers: President, H. E. Hunter; vice-president, E. V. Settles; treasurer, C. A. Trowbridge; and secretary, John D. Hunter. The company is now located in its own building on Collier Street.

Contracts Awarded.

Seattle, Wash.—The following bids were received for the heating and ventilating of two two-story wings to the B. F. Day School, in Seattle: Musgrave & Blake, Seattle (awarded the contract), $18,766; Norton & Smith, Seattle, $19,795; Rautman Plumbing & Heating Co., $21,368; J. N. Scherer, $20,903; Wenzler & Ward, Seattle, $19,060; W. D. Allen, Seattle, $20,823; F.

The Mouat Vapor Heating System

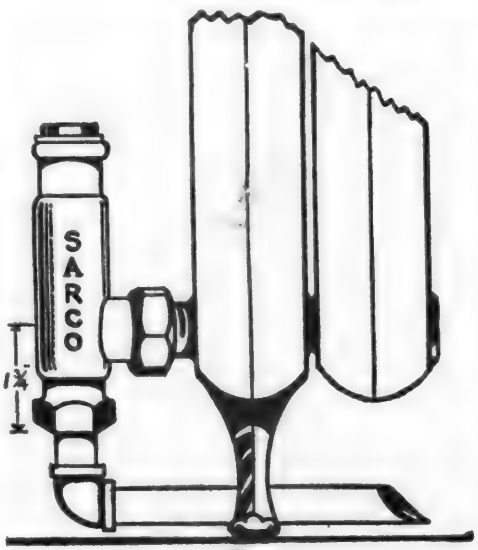
A System with Exclusive Desirable Features

By rendering the kind of heating service that people have always wanted and have never before been able to obtain, The Mouat Graduating Vapor Heating System is being rapidly adopted by those who want the very **best** system in existence.

The Mouat System uses vapor as the heat carrying agent. As much or as little heat as desired may be obtained by turning the Mouat Fractional Valve, which permits any percentage of the radiator to be heated. The heat responds immediately and the Mouat Regulator automatically conforms to the varying requirements, operating damper when coal is used, or governing the amount of gas entering the boiler when this fuel is used. The system operates on the very low pressure of an ounce or so with a marked saving in fuel consumption over other systems and it is safe, sanitary and absolutely dependable.

High class dealers wanted in localities where we are not now represented. Write **today** for the booklet, "The Attainment of Perfect Heating," and new Catalog.

Manufactured by
The MOUAT SQUIRES Co.
Cleveland, O., U. S. A.
At 1244 W. 4th St.



THE

RADIATOR TRAP SARCO

fits in places where other style traps can't be used without extra expense for special casting or fittings. It is furnished with 1¾" distance between openings or with 3" as desired. You can also install it at any angle without affecting its efficiency. It adapts itself at once to any location of return piping, which means reduced installation cost, and avoidance of delay in waiting for special traps not carried in stock.

The Sarco is used on low pressure, vapor or vacuum heating systems. Absolutely noiseless in operation, self-cleaning, cannot freeze, because of no water seals, cannot get air bound and eliminates water hammer.

Try one and be convinced.

Send today for prices.

SARCO COMPANY, Inc.

Woolworth Bldg.
NEW YORK
CHICAGO **DETROIT**

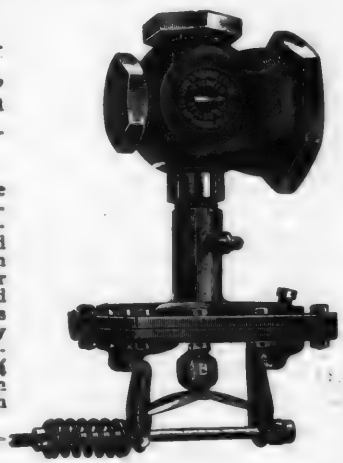
For Safety, Sureness of Operation and Durability

FOSTER PRESSURE REGULATORS

FOR STEAM HEATING SERVICE

(Classes "Q" and "Q H") lead the way. Designed especially for steam heating, and suitable for vacuum systems, for delivery pressure of from 1 to 15 lbs.

We make several types of pressure regulators—those shown in the illustrations here were designed particularly for steam heating service, and they are very sensitive, reliable, high grade in every particular and superior to other makes in construction and workmanship. There are no weights or close fitting pistons, and are easily adjusted to the desired pressure between 1 and 15 lbs. Made in sizes ¾ inch to 2 inches inclusive, composition body. Larger sizes are fitted with composition renewable seats.

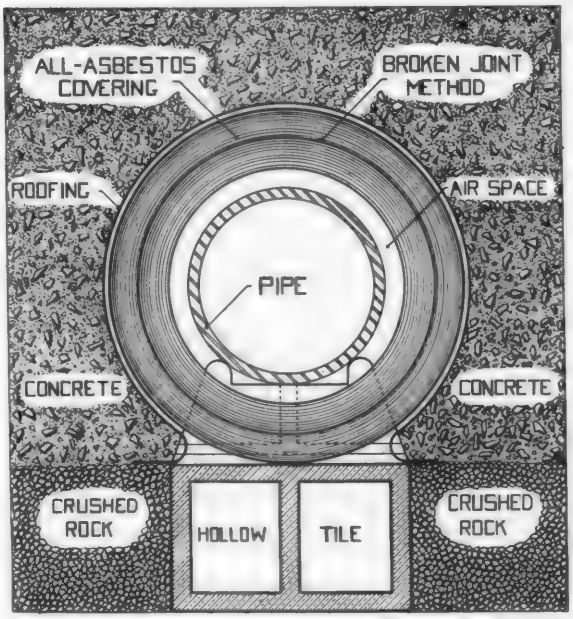


Class "Q" Class "Q H"

These Valves are fully explained on Pages 29 to 33 of our General Catalogue, No. 20.

FOSTER ENGINEERING CO., Newark, N. J.

CHICAGO, ILL., 189 North Dearborn Street
PITTSBURGH, PA., 518 Park Building
PHILADELPHIA, PA., 601 Harrison Building
BOSTON, MASS., 161 Summer Street



A type of Heating Mains with few specials—easily installed—permanent

INDESTRUCTIBLE

Conduit is made of CONCRETE and every LOCALITY "has the MAKIN'S"

Let me furnish you the covering, expansion joints, etc., together with complete specifications to meet your case.

Ask for quotations or estimates.

J. C. Hornung, Engr.

111 West Monroe Street
Chicago

Hellenthan, Seattle, $19,180; Lavan Plumbing & Heating Co., Seattle, 19,180.

J. F. Shea, Portland, Ore., heating and ventilating Capital Hill School in Portland, for $30,686.

San Francisco, Cal.—The following bids were received for the heating and ventilating of the new addition to the University of California Library Building at Berkeley: Scott Co., San Francisco, $29,880; J. E. O'Mara, San Francisco, $30,343; Robert Dalziel, Jr., San Francisco, $30,987; H. Wason, San Francisco, $31,000; Mangrum & Otter, San Francisco, $32,393; Turner Co., San Francisco, $32,000.

Allentown, Pa.—The following were bidders for the heating and ventilating of the Mosser School in Allentown: American Warming & Ventilating Co., Pittsburgh, $12,350 (heating), $1,980 (ventilating), and $1,250 (vacuum cleaning); Columbia Heating and Ventilating Co., Columbus, O., $13,709 (heating), $2,274 (ventilating); William H. Taylor & Co., Allentown, $18,258 (heating), $1,500 (ventilating).

Business Troubles.

New York.—Judge Hand has confirmed a composition of Phelps Bros. Co., Inc., manufacturers of heating apparatus, at 210 Water Street, with creditors at 60 cents on the dollar. The company's liabilities were $87,881.

Homan H. Beals, 151 Cliff Street, New York, engaged in the heating and plumbing business, has filed schedules in bankruptcy, with liabilities of $18,012, of which $15,931 are unsecured claims, and assets of $4,566, represented by debts due on open account, $4,153.

Business Chances.

Washington, D. C.—Sealed proposals will be received at the office of the Supervising Architect, Treasury Department, for the following-named work:

Until June 15, 1916, for the construction

¼ H.P. Equipment

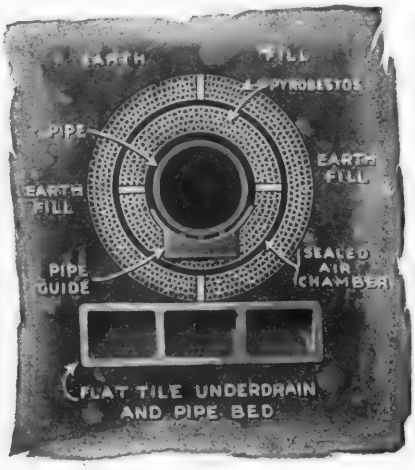
Spencer Turbine Vacuum Cleaners

are manufactured in sizes from ¾ H. P. to 40 H. P.

Send for catalogue

SPENCER TURBINE CLEANER COMPANY

HARTFORD, CT.



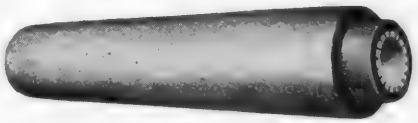
Pyro-Bestos Underground Pipe Insulation

For piping from central heating or power station to detached buildings of Universities, Asylums, Hospitals, Factories, etc. Also as underground Pipe Conduit for heating private Auto garages direct from House heating system. Lasts longer than Wood; in fact indefinitely. Easily applied and of reasonable cost. Is water repellant—does not absorb moisture like Magnesia, Infusorial Earth or the loose filling in Tile Conduit systems, all of which materials acting like a wet sponge held against the piping soon rust holes in the piping. We have cases on record where Insulations of the absorbent type have totally destroyed the piping in five years and less after installation, making it necessary to go all over again with the cost of digging trenches, new piping and new Insulation. No material of an absorbent nature should be placed around underground piping. Test all underground Insulations offered you by placing a fragment in a glass of water. If it absorbs water, don't use it.

National Air Cell Covering Co.

210-220 Van Brunt St., Brooklyn, N. Y.

STANDARD
Steam Pipe Casing



For Insulating Underground Steam Pipe. Tin Lined, or Unlined.

Every salesman has his argument in order to sell the product he represents. Listen to our argument, be the judge, and you will find same not theoretical but practical, and from actual experience.

When you cover your steam line with our make of casing you have the assurance that the line will be constructed so that no heat will escape, and will be water tight as well, with ample space for air chamber.

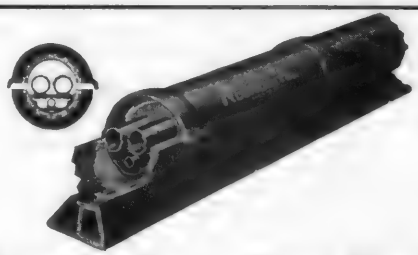
Should occasion arise that it is necessary to get at the steam pipe, our covering CAN BE TAKEN APART WITHOUT DESTROYING THE STAVES in the sections of casing, and the same casing can be used again. LET US EXPLAIN HOW.

If your line runs in different branches we will build the casing in exact lengths so that you will not have to cut any sections, which means no waste or extra expense to you.

Our method of building covering will be to your interest. Our product is right, attention prompt, and prices low.

SEND FOR BOOKLET

Standard Wood Pipe Co.
WILLIAMSPORT, PA.



Less Coal **More Heat**

If every large user of fuel demanded as high a degree of efficiency in the **distribution** of heat as he does in the **selection of fuel,** the

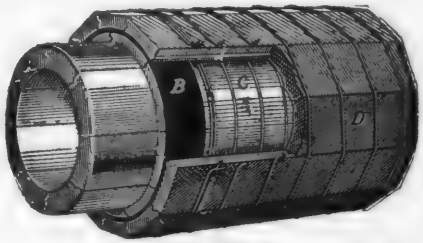
RIC-WIL METHOD

of insulating underground steam and hot water pipes would be in use everywhere that a group of buildings—or a whole city—is heated from a central plant.

The saving in coal alone may pay for the entire installation. Ask for Bulletin No. 30—it gives the details of an actual test.

THE RIC-WIL CO.

623 New England Bldg. Cleveland, Ohio



A—Inner Shell, 2 inches thick.
B—Asphaltum Packing.
C—Dead Air Space.
D—Outer Shell, 1 inch thick.

Cover Your Steam Pipes

WITH WYCKOFF'S IMPROVED

CYPRESS COVERING

Made of Gulf Cypress, the wood eternal

Not affected by wet and dry conditions common to steam-pipe trenches. Will not rot. Lasts twice as long as Pine Casing. Absolutely water and steam tight. Each shell is wound with heavy galvanized wire. Coated all over with the best known preservative—Hydrolene B.

Let us answer your questions and tell you all about it. Booklet on request.

A. WYCKOFF & SON COMPANY

ELMIRA . . N. Y.

Chicago, Ill., 551 West 14th Place
Pittsburgh, Pa., Johnson-Peter Co. Pittsburgh Terminal Warehouse

complete of the U. S. Post Office at South Boston, Va.

Until June 16, 1916, for the construction of the U. S. Post Office at Middletown, Conn.

Until June 19, 1916, for the construction complete of the U. S. Post Office at Neenah, Wis.

Until June 20, 1916, for the construction of the U. S. Post Office at Putnam, Conn.

Until June 21, 1916, for the construction complete of the U. S. Post Office at Douglas, Ariz.

Until June 22, 1916, for the construction complete of the U. S. Post Office at Rumford, Me.

New Publications.

TABLES FOR CALCULATING HOT WATER HEATING SYSTEMS, being the third enlarged edition by Dipl.-Ing. H. Recknagel, has been received. This pamphlet consists of nearly 50 tables, supplemented by a number of charts, explaining the method of applying the information given in the tables. The heat losses for various forms of heating surfaces, such as pipes and radiators, are given per degree difference, also the heat losses for radiators, coils, exposed and insulated pipes at various room temperatures and for hot water heating systems circulating at different temperature differences. Other tables contain heat loss factors for a variety of constructions, while additional tables give the delivery of various pipe sizes, under different conditions. These are supplemented by charts containing such information as surface, weight and capacity of various styles of radiators; standard pipe sizes; capacity and sizes of expansion tanks, and such additional information as would be of help to the designing engineer. The pamphlet is published in German by R. Oldenbourg, Munich and Berlin, Germany, and sells for 90 cents net (4½ marks).

Salesman Murphy

I know of a salesman in Chicago who has sold heating apparatus of all kinds—to architects, contractors, engineers, mines, purchasing agents, in fact nearly every class who buy heating equipment.

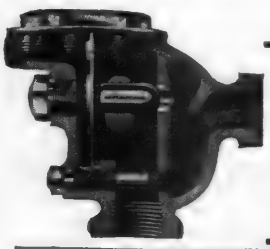
This man Murphy, first of all, is a mechanical engineer. He can make plans and specifications on the job. His early experience as a contractor in and around the northwest should be a valuable asset.

Mr. Murphy has sold boilers and steam specialties as far east as Pittsburgh, in the north, northwest, middle west, southwest, west and the Pacific Coast. He has blazed the trail in these territories—no one opened the way for him.

I am quite sure Mr. Murphy can produce results. He always has. And some mighty big deals I've seen him put over. Murphy's experience of 35 years has given him a mine of engineering and sales information and he is as active now as he was 20 years ago. Incidentally he holds several steam specialty patents and has a new down-draft boiler.

Look him over! See if you can use his services. He can get results for you if you've got something to sell that's worth-while.

I'm acting on my own initiative in trying to secure a suitable connection for Mr. Murphy. My services do not cost him anything—not even for this ad—neither will they cost you anything. Write me at once. Address MITCHELL, care of Heating and Ventilating Magazine.



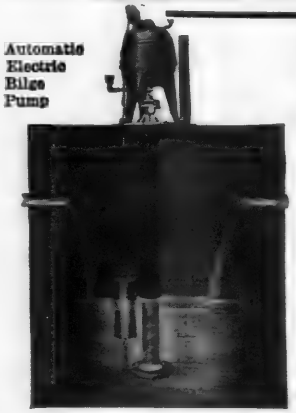
TRADE MONASH MARK

MONASH THERMOSTATIC VALVE

FOR LOW PRESSURE VAPOR AND VACUUM HEATING SYSTEMS

Self-cleaning—Noiseless and Positive in Service—Automatically prevents loss of steam—Has a vertical seat which cannot stop up with sediment and a loose thermostat which cannot rupture. Send for our latest catalogue.

Chicago **MONASH ENGINEERING COMPANY** New York



ECONOMY SEWAGE EJECTORS, Bilge Pumps and Cellar Drainers

Are AUTOMATIC—RELIABLE—EFFICIENT For EVERY PURPOSE

KEEP THE BOILER PIT DRY

ASK FOR CATALOG

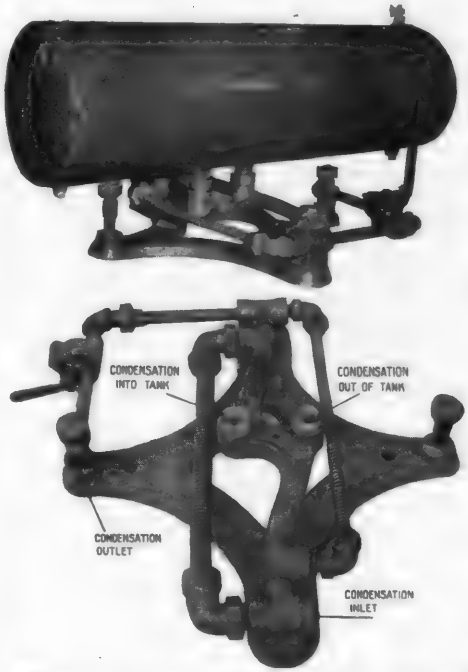
Economy Pumping Machinery Company

116-118 N. Carpenter Street CHICAGO

Phones: Monroe 5941-5942

The Farnsworth Traps

Handle Condensation Correctly
A Trap for Every Purpose



Showing base under tank and all working parts.

No trunnion stuffing boxes to leak or bind.

No weights or levers to adjust.

Tank has double seal of water always ahead of the steam.

Heavy rugged valve used.

Dirt cannot clog it; full open straight through blow.

Not a machined part except the tapping for the threads in the fittings.

Knife edge trunnions.

Separating Traps
Pumping Traps
Vacuum Traps
Direct Return Traps
Meter Traps

Agents wanted. Some desirable territory available. If interested, write us.

Farnsworth Mfg. Co.

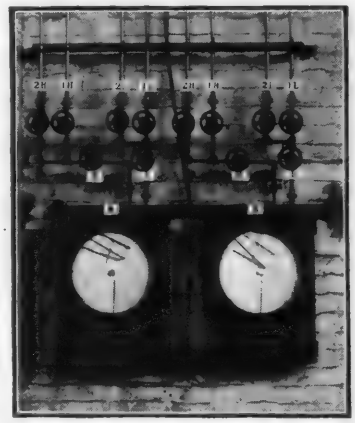
Engineers

65 Beverly St., Boston, Mass.

New York Office, 72 Trinity Pl.
(Successors to F. C. FARNSWORTH CO.)

Bailey Fluid Meters

measure Steam, Water and Gases accurately



These meters use a Monel metal orifice placed between a pair of flanges in a pipe line. Extensive tests made by purchasers of these meters over periods of more than two years prove conclusively that a high degree of accuracy is absolutely maintained.

The Bailey Meter not only records the rate of flow but is provided with an integrator from which the total flow can be read directly in thousand pounds.

Bailey Meters are used by Harvard University to measure steam purchased from a large Central Station. Payment for more than 160,000,000 pounds of steam has been made on a basis of results from these meters during the past two heating seasons.

These meters not only record the total weight of steam, but also its pressure and temperature, so that the total number of B. t. u. delivered is accurately determined.

Two six-inch pipes supply this steam. Each pipe has two orifices, and both meters may be used in series on the same line checking each other, or one meter may be connected to each line by merely changing the ¼" valves above the recorders. No steam can get by without being metered. All steam that is used is metered accurately.

Write for detailed information.

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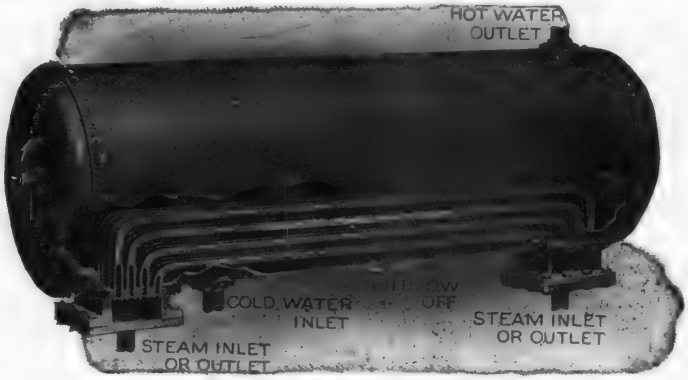

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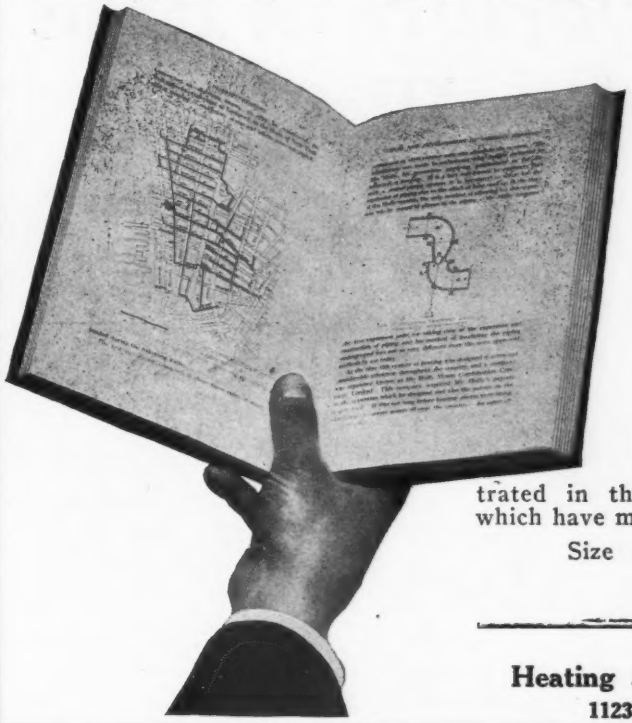

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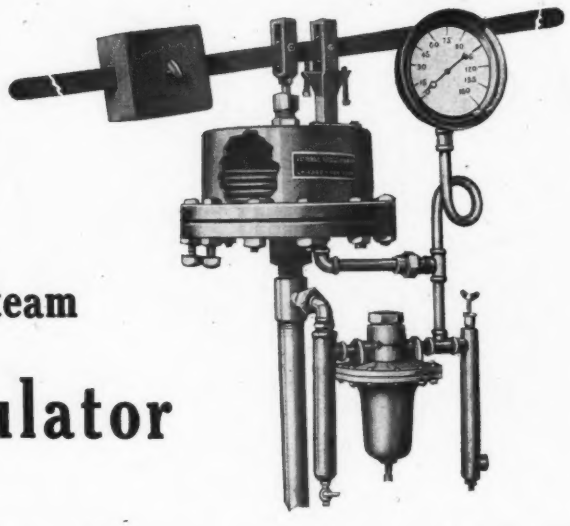

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